

Request for Proposals #0445

Provide a Managed Wireless Network at Lafreniere Park

SIGNATURE PAGE

The Jefferson Parish Department of Purchasing is soliciting Request for Proposals (RFP'S) from qualified proposers who are interested in providing Provide a Managed Wireless Network at Lafreniere Park for the for the Jefferson Parish Information Technology (IT) Department.

Request for Proposals will be received until 3:30 p.m. Local Time on: September 19, 2022.

Acknowledge Receipt of Addenda: Number: 001 - JF 10.14.2022
Number: _____
Number: _____
Number: _____
Number: _____
Number: _____

Name of Proposer: InfoLink USA Inc.

Address: 307 La Rue France, Lafayette, LA 70508

Phone Number: (337) 806-9770 Fax Number _____

Type Name of Person Authorized to Sign: Jon Fitzgerald

Title of Person Authorized to Sign: CEO / Team Lead

Signature of Person Authorized to Sign: 

Email Address of Person Authorized to Sign: jfitzgerald@infolink-usa.com

Date: 10/14/2022

This RFP signature page must be signed by an authorized Representative of the Company/Firm for proposal to be valid. Signing indicates you have read and comply with the Instructions and Conditions.



Proposal

Jefferson Parish – Lafrenière Park

Provide a Managed Wireless Network at
Lafreniere Park

RFP: 0045

3000 Downs Blvd, Metairie, LA 70003

SmartWAVE Technologies LLC

2662 Holcomb Bridge Rd, Suite 340
Alpharetta, GA 30022

InfoLink USA, Inc.

307 La Rue France
Lafayette, LA 70506



Restriction on Disclosure and Use of Data

The information contained herein is confidential and proprietary to SmartWAVE Technologies LLC. By accepting this document, Client agrees to use such materials and information solely for the purpose of evaluation and to hold such documents and information confidential and except as required by law, not to disclose them to any other person.

Contact Information:

Caroline Brown
Account Executive

SmartWave Technologies LLC
2662 Holcomb Bridge Rd, Suite 340
Alpharetta, GA 30022
678-983-3918
caroline.brown@smartwave.us

Catch the **WAVE**!





A. Cover Letter

SmartWAVE Technologies LLC

SmartWAVE Technologies LLC. (SmartWAVE) is a leading “wireless” centric systems integrator that provides the planning, design, installation and management of wireless networks, along with the unique applications that these networks support. We cater to the Smart City, Education, Healthcare and Enterprise markets, with an operating legacy of over 15 years. As a privately held organization, we have the ability to adjust more quickly and efficiently with market changes and the needs of our customers.

SmartWAVE was founded in 2007 as a Firm primarily targeting wireless solutions to Municipal Governments. Since our founding we’ve expanded to include marquee customer relationships in Education, Healthcare and the Enterprise Markets. As these wireless networks have evolved, our skillsets and product offerings have evolved to include the ever-changing Internet of Things (IoT). If you are looking for the Expertise required to deploy the network and applications throughout your Enterprise, a Campus, a City, or even a Small Country, our resources have the experience, capabilities and passion for delivery.

SmartWAVE is headquartered in Alpharetta Georgia, with additional warehouse office locations in San Jose California, Oakland California, McAllen Texas, Tucson Arizona, and Omaha Nebraska.

Services Provided for the Project

- Dedicated WiFi coverage in identified areas to provide free public WiFi
- Field Site survey to determine number of access points needed
- Work with the city to identify assets required for installation of equipment
- Provide Firewall for security services
- Identify local Service Provider to provide competitive pricing for internet services at the park
- Portal page for authentication
- Analytics on network infrastructure utilization
- Provide turn-key management of the solution installed
- Ongoing helpdesk support to manage connection issues

About the Project

We understand that Jefferson Parish is interested in bringing in a network to provide free WiFi Internet Access to Lafreniere Park. After reviewing the RFP and Addendum, understanding the needs for the community, and the impact of this initiative, there are 3 unique and specific requirements of this project that perfectly align with our expertise and experience:

Municipal Network Project – No other responder can claim the number of successfully deployed outdoor City WiFi networks than SmartWAVE.

Outdoor WiFi Project Design and Installation Expertise – Our methodology, combined with our investment in tools for outdoor wireless networks, will guarantee your success. We understand and appreciate what it takes to work with the variety of city departments from Public Works to Information Technology and Economic Development, in providing for a successful deployment.

Ruckus Outdoor Deployments – No other reseller can match the expertise and experience in deploying Ruckus WiFi products in the outdoor environment. This success has lead to our 4 time Partner of the Year Status, our Elite Reseller



Status, our Smart City Specialty Partner certification, our High Density Public Venue Specialty Partner certification, and our CBRS Specialty Partner Certification.

Understanding our qualifications as it relates to the project, it is our hopes that, within this document, Jefferson Parish's Evaluation team will find the content, thoughtfulness, experience, and same passion in this response as we exemplify in the services that we provide to our Smart City customers throughout the United States.

Contact Information

If you have any questions regarding this document, or the content herein, please don't hesitate to contact Caroline Brown at 404-731-9580 or al.brown@smartwave.us. Thank you for your consideration!

Al Brown
CEO



InfoLink USA, Inc.

InfoLink is a Lafayette Louisiana IT services company specializing in design and operation of carrier and enterprise wireless networks. Founded in 1998, InfoLink is a Telecommunications solutions architectural firm that specializes in fiber optic and wireless communication infrastructure projects. InfoLink has developed solutions for a wide range of wired and wireless carriers, county and municipality, large public venues, enterprise and industrial facilities. Our methodology is to work with our customers from concept to launch as well as provide day 2 and ongoing support and management for key infrastructure and systems. InfoLink also specializes in leveraging our combined industry contacts to make available the marketplace of application and bandwidth providers.

The partnership between SmartWAVE and InfoLink was forged over the last two years while developing an academic network serving a two-mile area in Lafayette, Louisiana. The Link & Learn network serves students of Lafayette Public School System with an all Wi-Fi 6 fiber feed street level system.

Our combined vision for the Lafrenière Park in to utilize state of the art wireless network to enable integration of customer facing services. Our team is committed to the long-term development of advertising and location based services culminating in a viable economic model to fund the system operation and expansion.

Jon Fitzgerald
CEO



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C. Technical Proposal

Deployment Methodology

SmartWAVE takes a methodical approach in designing wireless network infrastructures. This section provides an overview of the Statement of Work necessary to successfully complete this project.

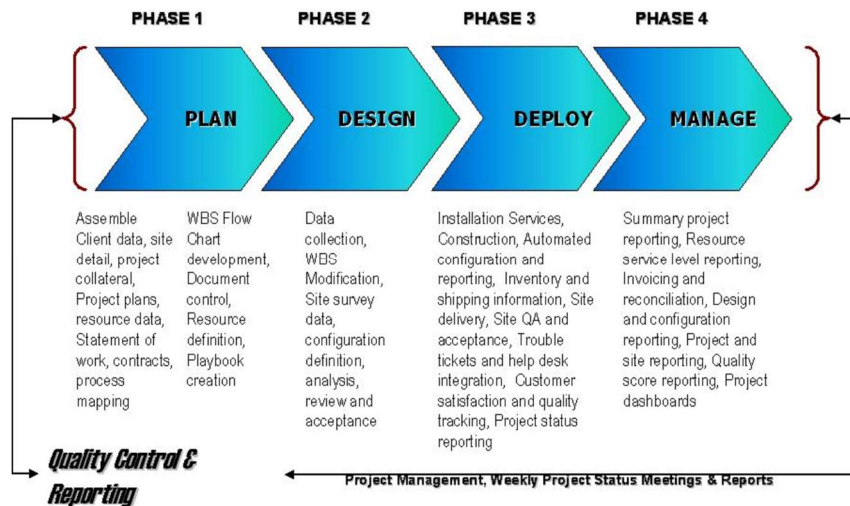


Figure 1. SmartWAVE Methodology

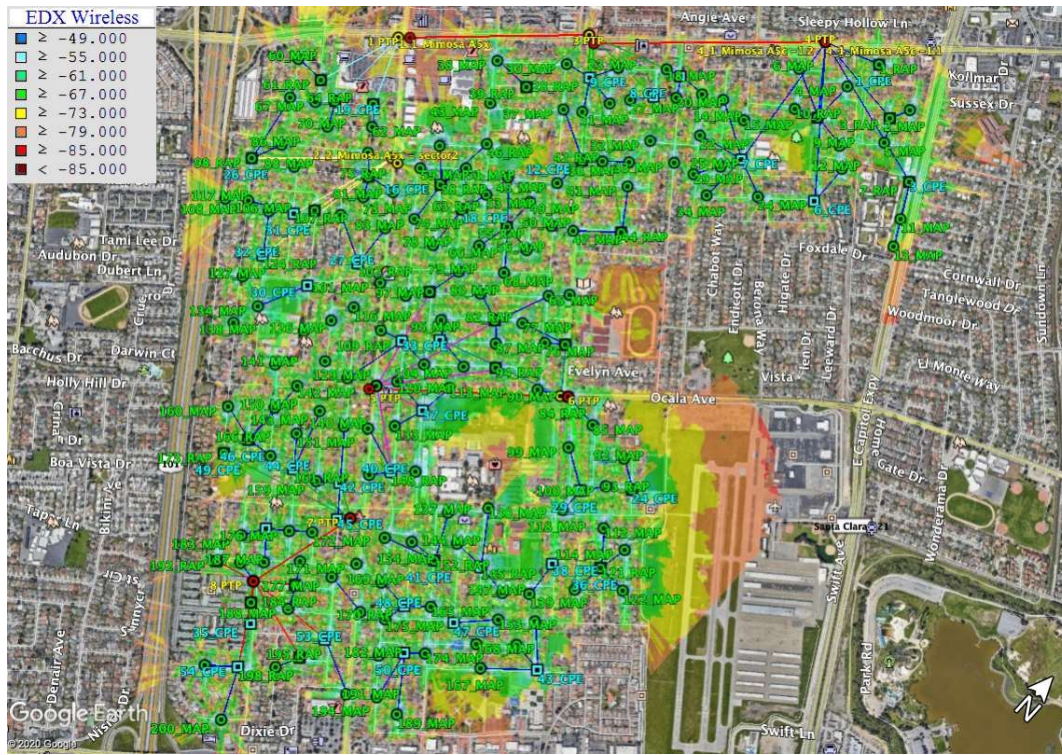
Network Planning Phase

The purpose of this phase is to better understand the area, requirements, and determine the components and architecture of the network. Based on boundaries, general coverage and capacity requirements, redundancy requirements, device type, fiber location information, and any other asset agreements provided by customer, SmartWAVE will perform the following work:

- Gather Building, GIS and land use data and generate estimated number of nodes based on provided information and general area types
- Cut Clutter to depict RF Environment obstacles for outdoor radio locations
- Utilize tools-based software analysis to identify:
 - Potential issues with Backhaul/Capacity Injection
 - Topology, trees, and building/housing coverage issues
 - Potential mounting assets required to meet general coverage area requirements
 - Potential access coverage/exclusion area issues
- Create a preliminary high level design document containing:
 - Network requirements
 - AP estimates from Land use and general drive area
 - Preliminary BOM for materials required
 - Radio and antenna mounting recommendations
- Provide predictive model for coverage, identifying ingress/egress points, and exclusion areas



Network Design Phase



NOTE: The above is a sample propagation model for a coverage area consisting of 200 Mesh Access Points.

The purpose of this phase is to validate the network architecture developed during the Planning Phase and collect data regarding mounting assets and locations. During this stage, SmartWAVE will perform the following work:

- Perform requested site surveys to validate selection of mounting assets, and issues with assets (e.g. power), no assets available, and interference problems.
- Conduct basic analysis of access coverage, backhaul/capacity links, redundancy, and hop counts
- Identify and document mounting solutions at each surveyed location
- Conduct an RF sweep at each AP location
- Conduct an RF drive sweep of the coverage area

Design Phase Deliverables

Upon completion of the Wireless Network Planning and Design Phases, SmartWAVE will provide the necessary documentation required to begin the configuration, commissioning and deployment of the network. Deliverables will include the following:

- Create Survey and Design Document
- Create updated BOM and Cost Estimate for Implementation
- Identify Customer Network Requirements
- Define basic network configurations for nodes plus identify any site/node specific parameters
- Create configuration spreadsheet with design information



- Conduct as-needed design review meetings and provide document updates as needed

Installation Phase

Assumptions:

- Existing light poles will structurally support the proposed equipment
- Power is available at each pole .

Exception: This proposal assumes a phased approach. The initial phase would be equipment and methods outlined in this proposal with the expectation that the InfoLink-SmartWAVE team will partner with Jefferson Parish on optimizing project deliverables in further phases.

- It is expected the InfoLink SmartWave team will partner with the Jeff Parish team to develop good market strategies for a revenue model.

Upon completion of review of the design phase, InfoLink USA, will work with the Client to deploy the wireless network. During this phase, InfoLink USA will provide the following services:

- Configure and test Management Platform
- Configure and test all wired and wireless radio equipment included in the bill of materials
- Install all mounting hardware for radio equipment
- Install and align all directional antennas
- Install grounding wire, surge protection and weatherproof all connectors on outdoor radio equipment with external antennas
- Move wireless equipment to production
- Perform post installation point coverage test using AirMagnet or similar software for radio service areas
- Document the final implementation

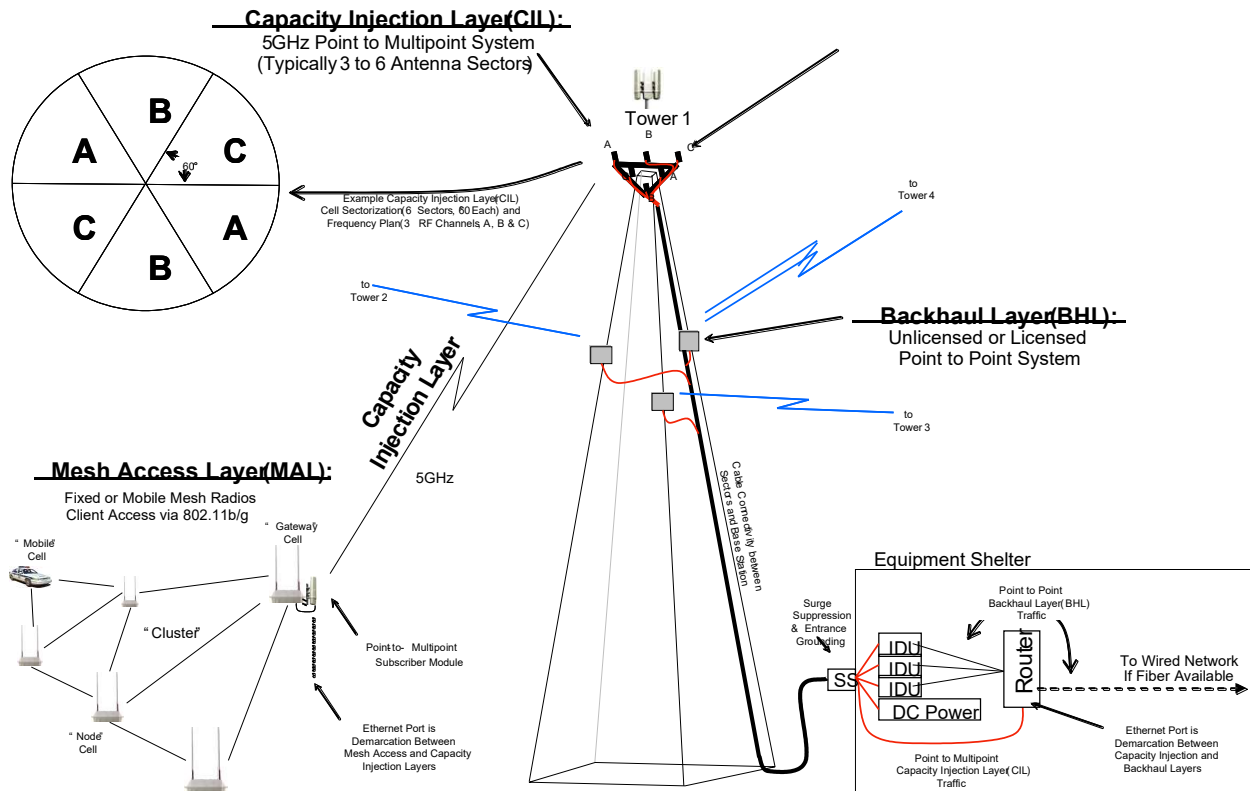
Installation Phase Deliverables

- As-built documentation of installed network to include all outdoor wireless radio equipment
- As-built design document to include heat map of final installation
- Provide an AP Inventory to include Serial Numbers and MAC Addresses
- Develop operational turnover documentation to transition the installed network to Maintenance and Support

Network Architecture

This section provides a high-level overview of the proposed network design architecture. We deploy these network architectures in layers to provide for the greatest flexibility and scalability with respect to providing services:

- Backhaul Layer – Comprised of wireless point to point (PTP) equipment or fiber within a coverage Zone to provide connectivity between multiple towers and/or backhaul locations within a coverage Zone or to provide connectivity between multiple Zones.
- Capacity Injection Layer – Comprised of wireless point to multipoint (PTMP) to extend connectivity from wireless or fiber backhaul locations, such as Towers, buildings or intersections, to the street level to inject bandwidth into the Mesh Layer.
- Mesh Access Layer – Comprised of WiFi Mesh nodes that include (1) Root Access Points (RAPs) that are APs connected to a CPE from the Capacity Injection Layer and (2) Mesh Access Points (MAPs) that are APs that extend WiFi to clients in the area.



Equipment Proposed

The Backhaul layer will include Cambium Terragraph equipment using the 60GHz frequencies to inject capacity into the WiFi Mesh Clusters, as well as provide for direct backhaul for high bandwidth applications such as video.

Ruckus Mesh WiFi equipment using 5GHz and 2.4GHz frequencies will be used for WiFi connectivity. The Ruckus WiFi APs include a USB port to connect Smart City applications. The Ruckus APs are extremely low profile to include internal antennas.

The Cambium and Ruckus equipment proposed have a very small profile, leading to a reduced wind load on the structural integrity of the street light poles, and provide for an aesthetically pleasing deployment.

Data Sheets for Equipment proposed are included in Attachment C.

Network Capacity

SmartWAVE's proposal includes a very high capacity in the backhaul layer and at the WiFi layer in order to leverage the 10Gbps circuit the City plans to bring into the park.

The capacity of the proposed Cambium Terragraph backhaul solutions are as follows:

- Cambium v5000 Distribution Node: Up to 15.2Gbps (7.6Gbps/7.6Gbps)
- Cambium v3000 Client Node: Up to 7.6Gbps (3.8Gbps/3.8Gbps)
- Cambium v1000 Client Node: Up to 2Gbps (1Gbps/1Gbps)



- Each v5000 can support connectivity for up to 28 clientsCambium 60GHz Terragraph Solution

The capacity of the proposed Ruckus WiFi Access Points are as follows:

- Ruckus T750 WiFi-6 Outdoor AP: Up to 3.4Gbps
- Each T750 can support connectivity for up to 1024 clients

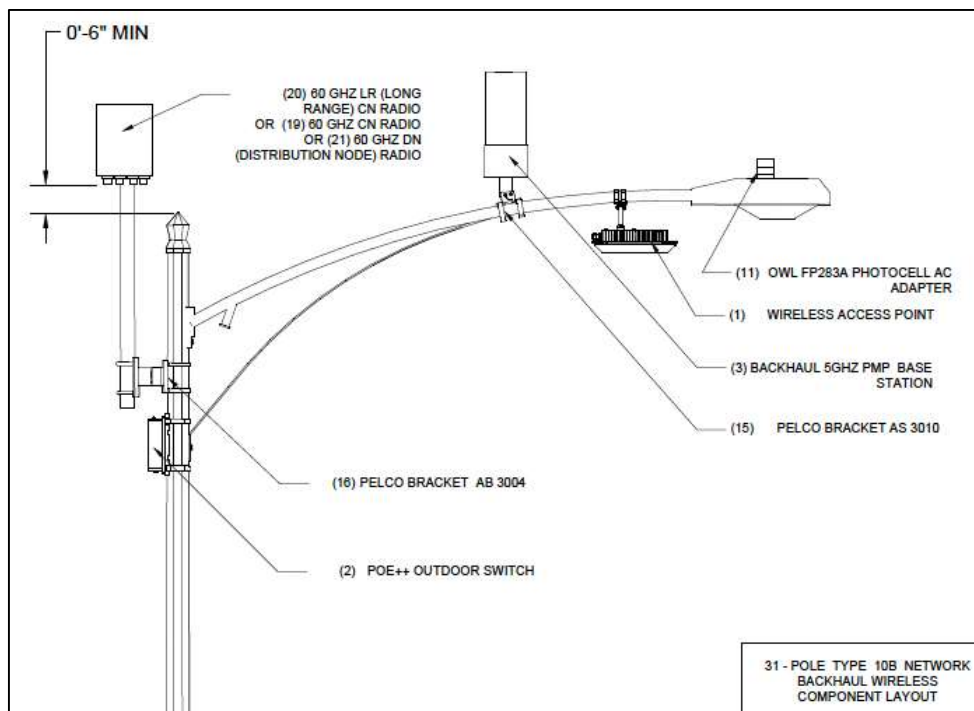
Core Network Equipment

The network will leverage the Parish's existing core infrastructure equipment to include core router, firewall, authentication services, DHCP services and other core network functions. We can also provide these items if needed.

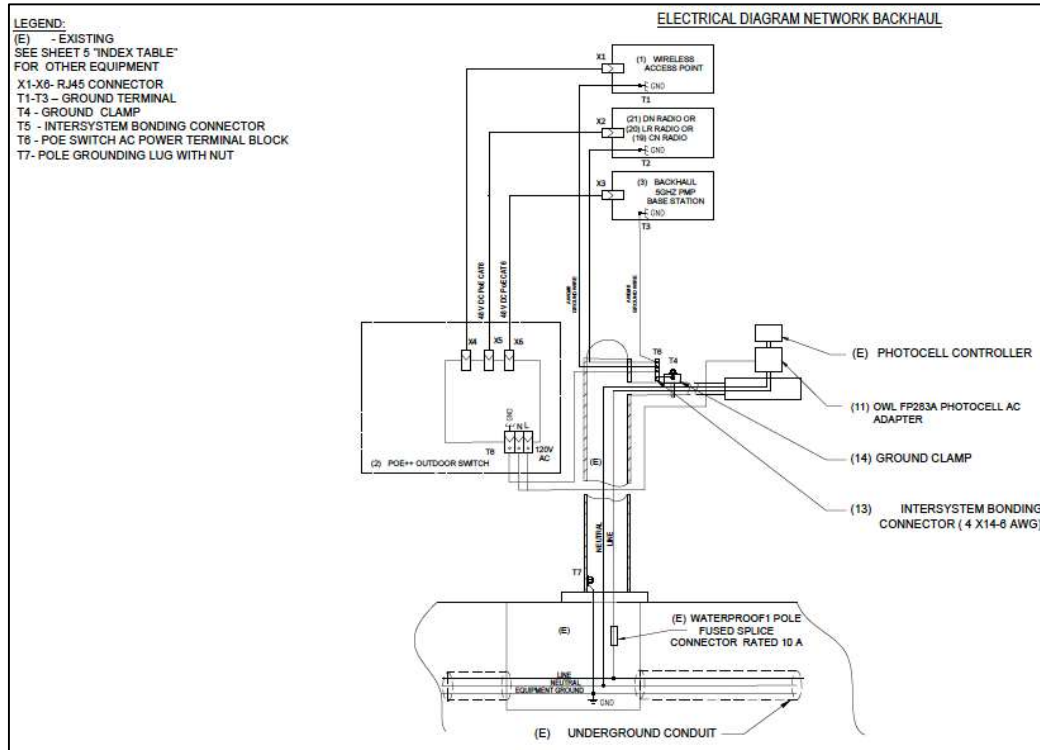
We can also configure the network to broadcast an SSID to support Municipal Services (Video, Sensors, etc) in addition to the Public WiFi Access SSID. The network can be segmented logically to move public access traffic through the parish's core network infrastructure and route access to include firewall and filtering services.

Installation Diagrams

The following is a sample drawing of a Terragraph Distribution Node installed on a Street Light along with a Ruckus WiFi AP on the mast arm:



The following is the electrical diagram for the previous installation of the Terragraph Distribution Node and Ruckus WiFi AP:



D. Managed Services

Network Operations Center

SmartWAVE utilizes a virtual NOC solution powered by Paisler's PRTG Network monitor integrated with Zendesk. Network outages are monitored both by device up/down/latency monitoring, as well as abnormal client traffic heuristics detection. Alerts are acknowledged by staff NOC staff and ticket assigned to field technicians until resolution. Zendesk ticketing allows the creation of ticket from call center staff with the ability to communicate to the end customer, so they can be informed until resolution.

The decision to virtualize the NOC was made to help facilitate around the clock support from multiple time zones. Engineers and support staff can provide seamless coverage whether they are working in the office or remotely. SmartWAVE found this solution provided more flexibility than a centralized office NOC when adapting to the Covid-19 pandemic changes in employee work locations across the country.

Specific to this project, SmartWAVE will work with Jefferson Parish create an SLA specific to the needs of the project. Standard terms for these types of networks for support are as follows:

- SmartWAVE will provide 8x5x4-Hr response to support requests, to include 5-day repair/replacement (requires purchase of spare APs and limited to Spares available)
- SmartWAVE will provide monitoring, alerting, and reporting for all WiFi equipment and assets.
- SmartWAVE will provide all resources, e.g. staff, equipment, and vehicles/tools to ensure the above specified service requirements are met.



- SmartWAVE will provide an online trouble reporting system that tracks open trouble tickets and includes automatic escalation and notification based on service level requirements and issue progress.
- SmartWAVE will provide monthly reporting showing AP uptime and usage data analytics to include client counts, data consumption, application usage and other statistics as requested by the client.
- SmartWAVE will provide equipment firmware updates and server management software updates as part of maintenance and support
- Additional products and services are \$175/Hr for a Network Engineer, \$95/Hr for a Network Technician, and Materials at Cost plus 20%. Prices exclude travel and expenses

Network Reporting

Content for Network Reporting

The type of content we typically provide our Smart City clients is traditionally restricted to usage and capacity metrics. The most common types of information that our clients receive reporting are:

- Total Client Count
- Total Data Sent
- Average Transmit/Receive Rate
- Types of Devices
- Top Applications

The following is a sample report of a network with over 1000 devices.



Policies on Privacy, Data Gathering and Net Neutrality

SmartWAVE adheres to all Federal and California policies regarding privacy and net neutrality to include CCPA.

SmartWAVE does not collect personal information or sale information from users of the service. Data collected is for service management purposes only.

As a best practice, we exercise the following:

1. Have procedures for dealing with legal information requests and providing notice to users.



2. Collect the minimum amount of information necessary to provide Internet services.
3. Store information for the minimum time necessary for operations.
4. Effectively obfuscate, aggregate and delete unneeded user information.
5. Maintain written policies addressing data collection and retention.
6. Enable SSL as much as possible to secure user information and communications.
7. Understand threats to the security of sensitive information and communications on our systems and mitigate them appropriately.
8. Follow best-practice principles for the use of cookies.



Bill of Materials for the Deployment
Please see Attachment A for price breakdown

Services and T/L/M		
	Materials / Equipment	\$128,258.00
	Planning / Design Services	\$30,355.00
	Installation Services	\$67,985.00
	Remote Support – 1 Year	\$12,050.00
	Tax (N/A)	\$0.00
	TOTAL	\$ 238,648.00



Proposed AP Placement Map and Predictive Coverage



AP Placement Map



Predictive Coverage Map

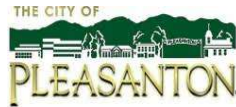


E. Proposer Qualifications and Experience

Prior Experience

SmartWAVE has been providing similar services to Municipal Governments since our founding in 2007 (15 Years). A sample of Smart Cities where we have provided similar WiFi design and implementation solutions for public access include:

- Lafayette LA
- San Jose CA
- San Leandro CA
- San Mateo County CA
- Dublin CA
- Pleasanton CA
- Mountain View CA
- Los Angeles CA
- Richmond CA
- Omaha NE
- Lincoln NE
- Council Bluffs IA
- Tucson AZ
- Marana AZ
- Atlanta GA
- McDonough GA
- Gainesville GA
- Roswell GA



In concert with our unique skillsets and experience, our experience with the products proposed is unmatched in the industry:

- Ruckus Channel Advisory Council Member – 2009 through Current
- Ruckus Customer Support Inaugural Council - 2010
- 2011, 2013, 2014 and 2022 Partner of the Year Recipient
- Smart City and Public High Density Venue Specialty Partner
- Ruckus Elite Partner
- Ruckus CBRS/LTE Specialty Certification
- Largest Ruckus Wireless Municipal Deployments in the U.S.





As a result of the aforementioned, and unmatched levels of involvement with Ruckus Wireless, we have tremendous CxO relationships throughout Ruckus, which will provide tremendous value to the Parish for additional support, if required, for Engineering, Operations, and Marketing.

References for Similar Projects

Project Name:	Gainesville Public WiFi Project		
Owner:	City of Gainesville		
Contact Name:	Jonathan Reich, CIO, City of Gainesville		
Contact Phone #:	770-535-6858	E-mail:	jreich@gainesvillega.gov
Project Overview:	Community Based Wireless network deployed in the downtown square to support economic development and in the Parks to provide for community access. Network is comprised of Ruckus Mesh WiFi Access Points and various Point to Point (PTP) and Point to Multipoint (PTMP) technologies to extend network connectivity throughout the City. Project phases were completed on time and within budget.		
Project Name:	Wireless Network Services		
Owner:	City of San Jose		
Contact Name:	Ed Kim, Asst CIO, City of San Jose		
Contact Phone #:	408-793-6873	E-mail:	ed.kim@sanjoseca.gov
Project Overview:	Planning, design, installation and post installation support for all of the City’s wireless infrastructure, including WickedlyFastWiFi downtown, Community Centers, in the Airport and in the Convention Center. Wireless infrastructure includes all City owned facilities to include 60 Community Centers, City Hall, Public Works, Waste Water Treatment Plant, Police facilities, Fire facilities and all other city buildings. Wireless technologies include Ruckus WiFi, Mimosa Point to Multipoint, and Mimosa and SAF Licensed and Unlicensed Microwave. The networks serve over 100,000 unique clients per month. All projects have been completed on time and within budget.		
Project Name:	“CityLink” Community WiFi Network		
Owner:	City of McDonough		
Contact Name:	Steve Sikes, CIO, City of McDonough		
Contact Phone #:	678-782-6499	E-mail:	ssikes@mcdonoughga.org



Project Overview: Community Based Wireless network deployed in the downtown square for Economic Development and throughout the parks for public access. The network deployment includes the implementation of a Wireless Gigabit Microwave Ring to support connectivity between WiFi Zones and provide for redundancy between city facilities. Equipment is installed on Towers, Water Tanks, Buildings and Street Lights throughout the coverage area. The WiFi and Wireless Gigabit infrastructure continues to expand to support city facilities.

Employee Certifications

Please see attachment B for Employment Certifications and Credentials of InfoLink USA and subsequent contractors.

F. Innovative Concepts

Smart WiFi Suite

We recommend including the SmartWAVE Smart WiFi Suite along with the infrastructure. The Smart WiFi Suite will provide the Parish with a method to drive Advertising Revenue, Collect Usage Analytics, Run Campaigns for Special Events, and even provide Location Based Services.

Smart WiFi Suite

Smart WiFi solutions that work independently or together as a comprehensive suite.



Advanced captive portal, branding and marketing solution.

Advanced Captive Portal
Guest Insights
Contact Management
Touchless Menu



Comprehensive presence and behavior analytics reporting engine.

Presence Analytics
Traffic Counts and Flows
Heatmapping and Alerts



Robust landing page builder and ad campaign management system.

Landing Page Builder
Campaign Management
Reporting and Attribution



Marketing4WiFi

Customer insights and marketing automation powered by guest WiFi.

- ▶ **Gain Customer Insight**
Analyze identity data in real-time to better understand customer demographics, behavior, and traffic patterns
- ▶ **Improve Marketing Efforts**
Manage contacts, schedule email campaigns, and review performance to improve communication and increase sales
- ▶ **Reinforce Branding**
Personalize the WiFi customer journey from start to finish with feature-rich tools to showcase brand assets, voice, and tone
- ▶ **Build Customer Loyalty**
Data collected can be used to grow business through loyalty programs, brand awareness, advertisements, and promotions
- ▶ **Drive Immediate Revenue**
Collect payments for premium WiFi access using built-in integrations and drive direct revenue through guest WiFi
- ▶ **Enhance User Experience**
Offer a seamless connectivity experience for customers with a simple login process; allow unique access levels to members or VIPs with vouchers
- ▶ **Increase Network Security**
Protect back-of-house systems with a separate guest WiFi network, add a layer of network security for yourself and your guests

QUICK LOOK

- Easy-to-use WiFi marketing
- Robust CRM module and email marketing platform
- Detailed guest analytics
- Powerful remarketing tools
- Venue branding opportunities
- Hardware neutral integrations
- Payment and voucher modules



Analytics4WiFi

Powerful location analytics powered by WiFi.

- ▶ **Visualize Traffic Patterns**
Heatmapping technology visualizes how traffic moves through a physical area
- ▶ **Respond to Traffic Alerts**
Custom triggers let you know when traffic patterns change; deploy resources as necessary to direct crowds and promote purchasing behavior
- ▶ **Track Growth and Trends**
Record new and returning visitors, crowd size, busy days and times, and historical traffic data
- ▶ **Zero-in on Opportunity**
Isolate specific geographic areas within a venue to target messaging to the right visitors at the right time
- ▶ **Aggregate Data Collection**
Integrate collected entity data with existing datasets to seamlessly inform operations from one centralized dashboard; view data through single pane of glass
- ▶ **Feed Operational Strategy**
Strategically position merchandise, signage and advertisements based on traffic flow data; measure ROI and inform visual merchandising strategy

QUICK LOOK

- Consistent presence analytics independent of architecture
- Easy-to-use WiFi analytics software
- Trigger-based traffic notifications and alerts
- Real-time footfall insights
- Visual heatmaps
- Actionable insights for physical spaces





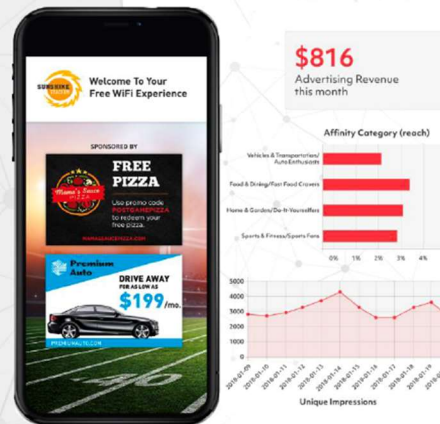
Ads4WiFi

Advertising campaign delivery and management designed to turn guest WiFi into a digital billboard.

- ▶ **Create WiFi Landing Pages**
Build advertising landing pages with an easy-to-use editor designed specifically for WiFi hotspots
- ▶ **Manage Sponsorships**
Activate and manage campaigns within an all-in-one management, delivery, and reporting system
- ▶ **Drive Advertising Revenue**
Easily create WiFi display and video advertisements and track revenue with built-in metrics
- ▶ **Provide Advertiser Visibility**
Give management access to advertisers to share metrics including impressions, conversions and ROI within easy-to-use dashboard
- ▶ **Analyze Detailed Metrics**
Collect user demographics, impressions, and CTRs and deliver detailed advertising reports including audience metrics and engagement insights
- ▶ **Seamlessly Manage Creative**
Easily upload new creative with a cloud-based platform and adapt to user behaviors with A/B testing

QUICK LOOK

- Hardware neutral WiFi advertising delivery system
- Single pane of glass management access
- User-friendly landing page editor
- Real-time advertising analytics
- Robust advertiser portal



G. Project Schedule

Please see Attachment D for proposed project schedule.

H. Financial Profile

SmartWAVE is a privately held corporation and maintains confidentiality around financial information and does not release this information in proposal responses to government entities.

That being said, SmartWAVE will gladly review financials in detail with appointed evaluation team members under non-disclosure. We can provide audited financials for 2021 and review Profit & Loss and/or Balance Sheets for previous years as requested.

To that end, we are proud to state that SmartWAVE has operated profitably since our founding in 2007. Key highlights include:

- SmartWAVE has never missed a payroll payment since our founding
- SmartWAVE Receivables are typically 2-3+ times the Payables outstanding
- SmartWAVE Net Margin has consistently met or out-performed the market for comparable companies
- SmartWAVE has no Long-Term Debt Outstanding



- SmartWAVE has a \$0 balance on the company's Commercial Line of Credit
- SmartWAVE maintains a cash balance to support Months of operating expense
- SmartWAVE has access to credit facilities with the capacity to finance to project
- SmartWAVE has the financial credit history and capacity to support a bond for the project if required

InfoLink USA is a privately held corporation and maintains confidentiality around financial information and does not release this information in proposal responses to government entities.



Smart**WAVE** Technologies
Enabling the Wireless Generation...



ATTACHMENT A: PRICE BREAKDOWN

	RFP: 0045 Price Breakdown						
	Project name: RFP 0045: Lafreniere Park						
	Created on: 10.14.2022						
	Item Number	Type	Manufacturer	Model	Description	Qty	Unit Price
PT/PTMP Backhaul Equipment	1.01			C600500A004A	600HcnWaw V::000 Distribution Node	1	\$1,883.70
	1.02			C000000L137A	Universal pole mounth bracket for 1" - 3" diameter poles	1	\$31.20
	1.03			c600500c024a	60Ghz on Wave V3000 Client Node Radio Only	7	\$929.50
	1.04			C600500D001A	60Ghz on Wave V3000 Client Node Antenna Assembly	7	\$109.20
	1.05			C000000L125A	cnWave Precision Mounting Bracket	7	\$379.60
	1.06			C000000L124A	Cable Gland, Long, M25 Qty 5	2	\$379.60
	1.07			C000000L138A	Grounding Cable 0.6m with m6 ring to m6 ring	8	\$6.50
	1.08			SFP-10G-SR	10G SFP+ SR Tranceiver 850nm	1	\$68.90
	1.09			L09-0001-SG00	vSCG License supporting 1 Ruckus Access Point	30	\$65.00
	1.10			L09-0001SCIW	Perpetual license for WiFi analytics to analyze 1AP with SCI 2. ststem Smart Licensing enabled	30	\$10.40
	1.11			901-T750-US00	Ruckus T750 802.11ax Outdoor Wireless Access Point, 4x4:4 Stream, Omnidirectional Beamflex+ coverage, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet port, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, GPS, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature	28	\$2,454.40
	1.12			901-T750-US51	Ruckus T750s 802.11ax Outdoor Wireless Access Point, 4x4:4 Stream, Sectorized Beamflex+ coverage, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet port, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, GPS, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature.	2	\$2,454.40
WiFi, Switches and Other Materials	2.01			SWNB181608-1 HF	x16x8 Inch 120 VAC Weatherproof Enclosure with Heater and Cooling Fan	1	\$942.50
	2.02			SW7N0447	Fortinet UTM Bundle (FortiCare plus NGFW, AV, Web Filtering, Botnet IP/Domain and Antispam Services) - Renewal - 3 Year - Service - 24 x 7 - Technical	1	\$12,018.50
	2.03			LPS3400ATMP-300	6-Port Gigabit Managed High Power 802.3bt PoE Switch with 4 PoE Ports and 2 SFP Fiber Gigabit Ports, 95W Per PoE Port, 300W Total	8	\$1,133.60
	2.04			APC1048-BT	Linkpower Injector converts 802.bt to 51V Passive PoE, Output 72W 1.41A	8	\$100.10
	2.05			MMK0001-L	Outdoor Pole Mounting Kit for outdoor switch	8	\$57.20
	2.06			SW-5771-20-1	Photocell Power Tap Continuous On; 120V; Base– Standard 3-prong Twist-lock per ANSI; C136.10; Cord length – 20 ft.; Cord Connection – pigtail; Circuit breaker–10A, auto-reset	19	\$239.20
	2.07			SWB46DRB-237X8-F	Non-Penetrating SLED Mount; 8ft Mast 6x6ft base	7	\$845.00
	2.08			SWCA60D	Outdoor grade Cat6 shielded cable, shielded RJ45 connectors, patch cables, etc.	14	\$182.00
	2.09			SWCMJPOE8a	POE Surge Protection 100/1000Mbps	28	\$53.30
	2.10			SWMISC	Shipping, grounding, weatherproofing, misc. and consumable items	1	\$1,852.50
Manufacturer Support, Network Monitoring/Optimization and Reporting	3.01			SC02-0001-1LSG	Associate Partner Support, Per SZ/(v)SZ AP, 1 YR	30	\$27.30
	3.02			S02-0001-1LSC	Associate Partner Support for SCI WiFi Analytics, AP License, 1 Year	30	\$3.90
	3.03			SWSPPT	SmartWave Technical Support - Network Monitoring, Optimization, Reporting, Revision Level Upgrades and Technician Dispatch - 1st Year	38	\$292.50
	4.01				Installation Service per SmartWAVE, InfoLink USA Inc., FrischHertz	1	\$67,985.00
Planning/Design Services per SmartWAVE, InfoLink USA Inc., FrischHertz	5.01				Planning/Design Services SmartWAVE, InfoLink USA Inc., FrischHertz	1	\$30,352.40
	TOTAL						\$238,648.00



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ATTACHMENT B:

EMPLOYMEE CERTIFCATION AND CREDENTIALS



Project Executive - Al Brown – Credentials

Al is President and CEO of SmartWAVE. In this role, he leads the company's growth, business strategy and position as an emerging market leader in providing innovative wireless networks and solutions. His responsibilities include P&L reviews, development of cost models, business plans and term sheets, identification of skill sets, and recruitment and management of team members. He is also responsible for leading negotiations for credit lines and facilities with distributors, manufacturers, and financial institutions to support growth of SmartWAVE and their markets.

Al has been published in trade magazines regarding the deployment of wireless networking architectures. Mr. Brown has also given several presentations on wireless technologies and deployments and is often asked to participate in wireless workshops with local government entities as well as speaking at National forums regarding strategies for overcoming the digital divide.

Al founded SmartWAVE in March of 2007 and has been engaged in the wireless industry since 1997. Prior to SmartWAVE, his corporate experience includes WFI, NetVersant, EDS and IBM Global Services. He received a Bachelor of Science in Mathematical Sciences from Clemson University. Mr. Brown was also a graduate of the EDS Systems Engineering Development program and the Executive Consulting Institute at IBM Global Services.

Lead Project Network Engineer - Walter Orell – Credentials

Walter has been with SmartWAVE since 2007 and has been a key contributor to the success in many of the higher profile wireless opportunities that SmartWAVE is involved in. Recent projects experiences include being the Lead Network Engineer for the Hidalgo County WiFi project (3300+ APs), OakWiFi Project (1100+ APs), and ESUHSD WiFi Project (1600+ APs). Other experience includes the Google Mesh Network in Mountain View, Lead Network Engineer for the City of San Jose Mesh network, and support for a variety of other Mesh, Point to Multipoint, and Point to Point wireless networks that SmartWAVE has deployed. He has worked with and supported a variety of municipal applications within these projects to include Transportation, Police, Fire and Information Services.

Walter is certified on a variety of wireless technologies including Tropos, Alvarion, Airspan, Ubiquiti, Ruckus, Proxim, Motorola, Cisco and Meraki. Mr. Orell holds a Cisco CCNA certification and has experience configuring, auditing Cisco WiSM and WCS Controllers, along with Routers, switches, and other peripheral devices. He is also trained on a variety of Video Surveillance platforms.

Lead Project RF Engineer – Nikolay Yumatov – Credentials

Nikolay has been with SmartWAVE since 2007 and has been a key contributor to the success in many of the higher profile wireless opportunities that SmartWAVE is involved in. Recent projects experiences include propagation modeling and RF design services for the Hidalgo County WiFi project in Texas (3300+ APs), the OakWiFi project in California (1100+ APs), and the ESUHSD WiFi project in California (1600+ APs). Other project experience includes an RF Feasibility study for a wireless mesh network for Microsoft for the City of Seattle, wireless network architecture design and propagation studies for the United Nations supporting the peacekeeper mission in Haiti, propagation studies and Mesh Design support for the Tucson Wireless Mesh Network, Lead RF Engineer for the Google Mesh Network in



Mountain View, and various network modeling and RF design work for other municipal entities. Mr. Yumatov is experienced with LTE, Mesh, Microwave, Point to Multipoint, and Point to Point technologies. He is well versed on a number of engineering tools and propagation software tools and is often the “preferred” request by our clients requiring complex wireless network design, such as Cisco Professional Services.

Nikolay is experienced with a variety of RF Tools including Sunset T10, Sunset E20, AM8e, FIREBIRD 6000, Oscilloscopes, Agilent HP 8563e Spectrum Analyzer, Anritsu MS2721a Spectrum Analyzer, AirMagnet Mobile Suite, VSWR meter, RF power meter, TV vector scope, PAL\SECAM signal generator. He is also proficient in the following software required for Network Architecture services: EDX SignalPro 6.2, PathLoss 4, Motorola LAN planer, Motorola MESH planner, MapInfo Professional 8.5, ArcGIS 9.1, Adobe Photoshop CS2, AutoCAD2007, Globalmapper 9, SATmaster PRO MK 6.5, Intelsat LST 5, MathCAD 14, MS Visio, LabView, MS Word, MS Excel, MS Access, MS Outlook, Google SketchUp, Google Earth Pro. Nikolay graduated with Honors with a MSEE from Penza State University in Penza, Russia.

Lead Deployment Project Manager – Tim Fowell – Credentials

Tim has been involved in a number of Community outdoor WiFi deployments at SmartWAVE to include managing the Hidalgo County WiFi project in Texas (3300+ APs), the initial phases for the Council Bluffs “Blink” WiFi network in Iowa (800+ APs), and the initial phase for the ESUHSD WiFi project in California (1600+ APs). Previous projects include Tropos Mesh and Airspan WiMAX and video network for Tucson DOT, wireless and video deployments for Pima County DOT, wireless video deployments for Marana DOT, wireless and video deployments for Oro Valley DOT, and a number of Licensed and Unlicensed Microwave and Point to Multipoint networks in other areas of the United States. He is a “working” project manager, managing and training installation technicians in wireless deployments, and participating in the installation as needed to assist and perform inspections. Having worked with SmartWAVE since the founding in 2007, he brings a wealth of experience in installation requirements, processes and procedures required by the participating agencies, providing essential information needed for effective project planning.

Tim has been trained and certified on a number of wireless products to include Ruckus, Mimosa, Cambium, Siklu, Nokia, Motorola, Ubiquiti, and SIAE. He is Comtrain Safety Certified to climb towers, in addition to his manufacturer certifications.



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info | LINK

CWNA/CWNE (Industry) Certifications



Tower Climb Certifications



SERVICES

DAS

- Distributed Antenna Systems
- Designed to frame and packetize RF signaling to enable flexible high performance coverage and capacity systems.
- Projects range across Alabama, Mississippi, Texas, and majority in Louisiana.

Network Management

- QoS for applications
- Bitrate monitoring/policy enforcement
- Security policy enforcement
- Optimize performance for specific groups of customers
- Payment gateways for different classes of users
- Detailed Analytics
- Location Based services

Event Support

- Providing a wireless solution for paid, free, and/or premium access to customers on event day
- Easy and cost effective for operator to manage
- Onsite/Offsite Support on event day
- Real-time optimization for any or preferred customer group

Custom Application

- Our team can write custom applications for specific requirements
- Test deployment methodologies and evaluate performance characteristics within your network environment
- Delivering custom optimizations of unique applications to discrete groups of users

CONTACT US



(337) 806-9770



jfitzgerald@infolink-usa.com



InfoLink-USA.com



307 La Rue France, Lafayette,
LA 70508

CONNECT WITH US

InfoLink USA is a Telecommunications Solutions Integrator that specializes in fiber optic and wireless communication infrastructure projects. InfoLink has developed solutions for a wide range of wired and wireless carriers, county and municipality, large public venues, enterprise and industrial facilities. Our methodology is to work with our customers from concept to launch as well as provide ongoing support and management for key infrastructure and systems. InfoLink also specializes in leveraging our combined industry contacts to make available the marketplace of application and bandwidth providers.



INDUSTRY CERTIFICATIONS

CCNA	VCP	MCP	MCTS	DCSNS	MCSA	VCA-DT	VSP-5
APCO—Public Safety Communications							



PROJECT INSTALLATION TEAM

Jon Fitzgerald

Position: CEO, Operations Team Leader

Qualifications:

Has 25+ years wireless communications industry experience; 8 Year army combat communications specialist. Alongside his wife, Monica Fitzgerald (President and Partner of InfoLink) they have cultivated InfoLink into an outstanding asset to Acadiana and the surrounding community.

Sasha Bacchus

Position: Administrative Assistant, Operations Team Member

Qualifications:

BS Mechanical Engineering; 2 years administrative assistance for local non-profit. 4 years technical engineering.

Mitchell Louviere

Position: Field Supervisor/Installation Lead
Operations Team Member

Qualifications:

>35 years of experience in installation and support services for a wide range of fiber optic and wireless communication projects. He is a valuable assets to the InfoLink team by supervising, installing, configuring and testing of equipment for customers. Trainings completed: Advanced Safety and Training Management (2000)—PPE, FA/CPR, Fall Protection, Crane Safety, Forklift, and Heat Stress, and Site Safety; Andrew Institute—Connector Attachment Training; Occupational Safety Training (2007)—METS Helicopter Underwater Egress and Water Survival; Evergreen QHSSE Solutions (2008)—Operations of Cranes & Rigging Training.

Shailendra Gaikwad

Position: Network Solution Architect,
Operations Team Member

Qualifications:

B.S. Computer Information Systems; M.S. In Electrical and Computer Engineering (ULL). Has worked in the wireless communications industry for +23 years and accomplished many feats in the realm of academia with four authored research paper publications, participation in peer reviewing papers, and collaboration in numerous projects around the nation, including a resultant patent application filed.

SHAILENDRA GAIKWAD

NETWORK SOLUTION ARCHITECT

CONTACT

307 La Rue France
Lafayette, LA 70508

(337) 806-9770

sgaikwad@infolink-usa.com

EDUCATION

Master of Science (M.S.) – Electrical and Computer Engineering
University of Louisiana, Lafayette, LA

Bachelor of Science (B.S.) – Computer Information Systems
St. Cloud State University, St. Cloud, MN

WORK EXPERIENCE

05/2020 – Present
InfoLink USA, Inc.
Network Solution Architect

2016 – 2020
Informatics Research Institute (IRI) / NEC Labs (Lafayette, LA/Princeton, NJ)
Research Assistant

CERTIFICATIONS

- CommScope: ND6463 Era Overview
- CommScope: ND5104 Wireless & DAS 101
- CommScope: ND5103 Understand dB and dBm
- CommScope: ND6464 Era RF Design
- RUCKUS – Ruckus Associate SmartZone Administrator

NOTABLE ACHIEVEMENTS

- Authored four (4) published research papers
- Listed as inventor for US Patent application: "Efficient Transfer of Sensor Data on Dynamic Software Defined Network (SDN) Controlled Optical Network"
- Recognized for work on cyber defense project at Center for Advanced Computer Studies (CACS)
- Blue Ribbon reward recipient from M/s Tata Communications Ltd.
- Member of Golden Key International Honor Society
- Member of SEA-ME-WE-4 Submarine Cable System Consortium

JON FITZGERALD

CEO, OPERATIONS TEAM LEAD

CONTACT

307 La Rue France
Lafayette, LA 70508

(337) 806-9770

jfitzgerald@infolink-usa.com

WORK EXPERIENCE

01/2015 – Present InfoLink USA, Inc. CEO / Team Lead	08/2013 – 12/2014 C Spire Contract Project Manager
08/2013 – 10/2014 DataTek, Inc. CTO	09/2011 – 08/2013 Southern Light LLC Senior Engineering Manager, Special Project Division
10/2009 – 08/2011 Forward Link, A Division of CBM of America Director of Enterprise Division	05/2007 – 10/2009 Cotton Wireless Services RF Services Manager
07/2005 – 05/2007 Hi-Tech Tower Operations Manager	02/2002 – 07/2005 Mobilemen LLC Founder and Partner
01/1999 – 02/2002 ProTower Corporate Board, Partner, and Project Manager	01/1985 – 01/1993 Unites States Army Signal Corps – Combat Communications Specialist

CERTIFCATIONS

NOTABLE ACHIEVEMENTS

-IEEE

MITCHELL LOUVIERE

INSTALLATION TEAM LEAD

CONTACT

307 La Rue France
Lafayette, LA 70508

(337) 806-9770

mlouviere@infolink-usa.com

WORK EXPERIENCE

2015 to Present
InfoLink USA, Inc.
Installation Team Lead

01/1999 to 02/2022
ProTower
Tower Technician / Foreman

05/2007 – 10/2009
Cotton Wireless Services
Technician

09/2011 – 08/2013
Southern Light LLC
Technician

1986 to 1991
United States Army
Communications Chief *Operation Desert Storm / Desert Shield*
101st Airborne

CERTIFICATIONS

- Various safety and tower training over the span of career
 - o 2000 PPE, FA/CPR, Fall Protection, Crane Safety, Forklift, Heat Stress, and Site Safety training with Advanced Safety and Training Management, Inc.
 - o 2007 METS Helicopter Underwater Egress and Water Survival/Swing Rope/Personnel Transfer Basket training with Occupational Safety Training, Inc.
 - o 2008 Operation of Cranes and Rigging training with Evergreen QHSSE Solutions
- CommScope Connector Certified, Trilogy Cable Connector Certification, and CommScope ERA Installation and Commissioning Certified
-

NOTABLE ACHIEVEMENTS



ABOUT US

Frischhertz is a family owned and operated electrical contracting company servicing the Greater New Orleans area and beyond. With unsurpassed expertise, experience, and manpower, Frischhertz can handle electrical projects of any size and for a broad range of industries. We manage commercial and specialty projects, and we frequently act as a design-builder.

All Frischhertz projects meet high benchmarks for quality while we maintain strict controls over safety, cost, and scheduling. Frischhertz offers peace of mind to customers who expect nothing less than professionalism, excellent work, and pricing transparency. Any time a customer has an issue or a question, a member of the Frischhertz team is available to provide a resolution or strategy.

In addition to being one of the largest electrical contracting firms in the Greater New Orleans area, Frischhertz also houses one of the top technology groups. Our services address clientele's needs for the latest in access control, surveillance and intrusion detection, structured cabling & fiber optics, network installation, voice/data/video, paging & intercom, and audio visual.

We also handle smaller service and maintenance projects, including generator installation, tenant fit-outs, special events, and disaster recovery.

Quality, efficiency and value are hallmarks of all Frischhertz projects. We are constantly striving to improve value for our customers by increasing time and cost efficiencies. We take great pride and satisfaction in offering our customers comprehensive, effective electrical solutions.

RECENT NOTABLE PROJECTS



The Sazerac House



The Fillmore

LOUIS ARMSTRONG N.O. AIRPORT

- Year: 2020
- Value: \$95,049,000

THE SAZERAC HOUSE

- Year: 2020
- Value: \$4,276,000

WWII HALL OF DEMOCRACY

- Year: 2020
- Value: \$2,192,000

THE FILLMORE AT HARRAH'S

- Year: 2019
- Value: \$1,477,000

DIXIE BREWERY

- Year: 2020
- Value: \$1,965,000

FIRST BAPTIST CHURCH

- Year: 2019
- Value: \$7,240,000

CAUSEWAY SAFETY CMAR

- Year: 2020
- Value: \$3,042,240

CAMBRIA HOTEL

- Year: 2018
- Value: \$3,078,000

2424 TULANE

- Year: 2020
- Value: \$3,924,000

STARLIGHT STUDIOS

- Year: 2017
- Value: \$893,500

KEVIN FRISCHHERTZ

COMPANY POSITION & YEARS EXPERIENCE

President

27 Years with Frischhertz / 27 Years in the Industry

EDUCATION & TRAINING

LSU Executive MBA

Mississippi State University - Bachelor of Science, College of Engineering

OSHA 30

First Aid, CPR and AED

NOTABLE PREVIOUS PROJECTS

Multiple Harrah's Casino Projects

Harrah's Casino Hotel

Ernest N. Morial Convention Center Phase III

WWII Museum

Ogden Museum

Methodist Hospital

Northshore Regional Hospital

St. Tammany Parish Courthouse

EXPERIENCE

As President, Mr. Frischhertz becomes the third generation to lead the family business established by his grandfather.

Mr. Frischhertz holds a degree in Electrical Engineering from Mississippi State University and an Executive MBA from Louisiana State University. He has practical experience at every level of the company, having served as a laborer in the warehouse, as an electrical apprentice in the field, as estimator on the pre-construction team, as project manager and most recently as Executive Vice President.

Mr. Frischhertz is a past president of the local National Electrical Contractors Association and has served on the Chapter Board of Directors since 2009. He is a member of the Board of Trustees for both the New Orleans Electrical Health Welfare and Joint Apprenticeship and Training Committees. Mr. Frischhertz is also active in local charitable and community organizations.

JONATHAN FRISCHHERTZ

COMPANY POSITION & YEARS EXPERIENCE

Vice President Project Management
10 Years with Frischhertz / 10 Years in the Industry

EDUCATION & TRAINING

University of Texas at Austin – Bachelor of Science, Electrical Engineering
Engineer in Training (EIT)
OSHA 30
First Aid, CPR and AED

NOTABLE PREVIOUS PROJECTS

- | | |
|----------------------------------|--|
| NOPSI Hotel | Folgers Chef Plant |
| 640 Magazine Street | Folgers Sandman Project Expansion |
| 700 Magazine Street | Folgers Rowland Harahan Plant Expansion |
| Cambria Hotel | Folgers Rowland Gentilly Plant Expansion |
| Louisiana Cancer Research Center | NASA Michoud Assembly Building 103 SL |

EXPERIENCE

Mr. Frischhertz joined Frischhertz Electric immediately after graduating from the University of Texas at Austin. He has worked in his family business since he was a teenager in various positions and is proud to continue his grandfather’s legacy by being part of the third generation of family who work at Frischhertz.

Previously, Mr. Frischhertz served as Project Manager of many design-build/assist projects with an emphasis on office, hospitality, industrial and medical projects. As Vice President of Project Management, he guides and manages a team of over 10 project managers, overseeing the overall workflow, policies, and performance of all projects. Mr. Frischhertz is also a current board member of the New Orleans Join Apprenticeship and Training Committee (NOEJATC).

DAVID MATHEWS

COMPANY POSITION & YEARS EXPERIENCE

General Labor Superintendent

35 Years with Frischhertz / 35 Years in the Industry

EDUCATION & TRAINING

University of New Orleans, General Studies

Delgado Community College, Electrical Construction

4-year Apprenticeship Training

NJATC Instructor Training

OSHA 10 and 30

First Aid, CPR and AED

NFPA 70E

Digger Derrick and Bucket Truck Instructor High-Voltage

NOTABLE PREVIOUS PROJECTS

New Orleans East Hospital

NOCHI

NOPSI Hotel

Cobalt Rehabilitation Center

East Jefferson Hospital

Loews Hotel

Hotel Monaco

Orleans Parish Prison

Hampton Inn Convention Center

U.S. Coast Guard

EXPERIENCE

Mr. Mathews has been with Frischhertz Electric for over thirty years. He has successfully completed numerous healthcare and hospitality projects during his tenure as Superintendent. Mr. Mathews advanced to the position of General Labor Superintendent in 2018 where he oversees all the electrical labor for the company.

Mr. Mathews is an instructor of the NECA/IBEW Foreman Development series. He also served as an instructor for the IBEW Electrical Apprenticeship Program.

KEITH RUSSELL

COMPANY POSITION & YEARS EXPERIENCE

Frischhertz Technologies & SoundWorks Department Manager

9 Years with Frischhertz / 31 Years in the Industry

EDUCATION & TRAINING

University of Southwestern Louisiana

Corning, Panduit, Systimax

OSHA 30

First Aid, CPR and AED

Various Vendor Certifications

NOTABLE PREVIOUS PROJECTS

Louis Armstrong N.O. International Airport

University Medical Center

1111 Tulane

Tulane Yulman Stadium

Cambria Suites

SLU Student Union Center

First Baptist Church Covington

Port of N.O. Cruise Terminal Security

Folgers Coffee

Drew Elementary

Delgado Maritime Facility

Bay Point Resort & Spa

EXPERIENCE

Mr. Russell has over thirty years experience in the low voltage (Technology/Audio-Video) component of commercial, educational and institutional construction.

From 1988-1991, Mr. Russell worked for BOE-TEL Communications as a lead foreman and installer. He then moved into the Audio Visual business as Director of Operation with Royal Productions and Major Communications from 1992-2005. In 2006, he worked for Fisk Electric as a Voice/Data/Security Project Manager and worked there until joining Frischhertz Technologies in 2011. Mr. Russell has served our Technologies group as an Estimator and Senior Project Manager, and he has now assumed the position of Department Manager of Frischhertz Technologies and SoundWorks.

MANDY ROMIG

COMPANY POSITION & YEARS EXPERIENCE

Safety Director

20 Years with Frischhertz / 20 Years in the Industry

EDUCATION & TRAINING

Loyola University New Orleans, Bachelor of Business Administration

Certified Occupational Safety Manager (COSM), Alliance Safety Council

OSHA 500 TTT

OSHA 510

First Aid, CPR and AED

NFPA 70E TTT

Silica

EXPERIENCE

Mrs. Romig has served as the Safety Director of Frischhertz Electric Co. since 2002. Her responsibility is to serve as a staff specialist in safety by developing, planning, implementing and managing various safety programs to reduce or eliminate occupational injuries, illnesses, deaths and financial losses. She also regularly performs job-site inspections, along with our third-party safety group, ESC.

Mrs. Romig is also a former instructor of OSHA 10 & 30 hour training, First Aid, CPR, Automated External Defibrillation (AED), and NFPA 70E. In 2015, she received training from the Alliance Safety Council and became a Certified Occupational Safety Manager (COSM).

PROJECT APPROACH

PRE-CONSTRUCTION PHASE

Frischhertz Electric Company (FEC) employs a motivated team of pre-construction professionals that are available to directly assist during the design-build phase of this project. FEC has a full-time staff of CAD professionals and designers to assist with field layout and design criteria for our field installation crews. We believe that time spent in the office during the pre-construction phase has a direct impact on the productivity of our field labor and quality control during the construction phase.

Once chosen for this project, FEC's Project Manager will work in tandem with the Pre-construction Department to prevent the need to bring new people "up-to-speed" at the beginning of the construction phase. This tandem approach also allows FEC to work closely with the general contractor to ensure that the project is designed within budget and free of scope-gaps or "holes."

Key pre-construction activities:

1. Site investigation to identify existing conditions
2. Meet with the owner and design team to discuss the use of each facility to better understand the requirements for power, lighting and special systems
3. Ongoing design team meetings to see the design through completion, while proposing construction solutions, substitutions, etc. to streamline installation and maintain budget
4. Involvement with local utility company and gear manufacturer for Coordination Study
5. Final design and approval of long-lead electrical equipment for order release and shop drawing submittals
6. Solidify special system requirements now to ensure a smooth and timely installation
7. BIM—Ensure timely completion of the BIM model to assist field coordination and identify pre-fabrication opportunities

CONSTRUCTION PHASE

Frischhertz will assign a two-man project team – Project Manager and Site Superintendent. Their expertise will be paramount to a quality and successful project.

PROJECT APPROACH

FEC's construction approach employs several different features:

1. Full-time General Foreman to execute weekly site visits to audit installation quality, NEC compliance, and staffing requirements.
2. Full-time Safety Director concentrating on the safety and well-being of FEC employees and the interaction with employees of other trades working adjacent to FEC.
3. ProCore Technologies Project Management Software - Frischhertz Electric utilizes ProCore Software for the management of all projects. Submittals, RFIs and Project Progress are tracked and managed through ProCore to increase project visibility and progress.
4. Pre-fabrication - Frischhertz Electric's Pre-fab Department will assist the Project Manager to identify potential pre-fabrication opportunities. Allowing certain items to be fabricated by our trained pre-fab installers increases field productivity and quality control measures. FEC has successfully implemented pre-fabrication techniques for lighting and distribution installations.

We intend to follow the general contractor's lead with the schedule, providing our input regarding our activities and durations in an effort to ensure it is both feasible and meets the overall project requirements.

Once power requirements are determined and designed, we will lay-out all feeder routes per the BIM model and start any early work available.

As soon as the job is fully released for construction, we will engage our Pre-Fab Department to begin work on all facets of work that we have identified while our field crews get started with layout and installation. Our crews will then work in the sequences agreed to in the project schedule with the appropriate manpower to push the project to completion.

COVID-19 SAFETY PRECAUTIONS

Due to the ongoing COVID-19 Pandemic, Frischhertz has instituted strict measures of compliance with all CDC and Governmental Agencies to protect FEC employees, their families, and the many contractors and subcontractors we work alongside. Our COVID-19 Safety Plan is available upon request.



SAFETY PROGRAM

For Frischhertz, the quality of our work and the welfare of our team go hand in hand. Our focus on safety begins with the applicant. We maintain a strict "Fit for Duty" program and drug testing policy for all aspiring field personnel. The health and welfare of each Frischhertz Electric employee is of paramount concern in the successful completion of each project. Frischhertz Electric painstakingly ensures that working conditions are safe, that employees are properly trained, and that they have the appropriate tools to safeguard against accidents. Through our monthly and weekly safety meetings, we regularly apprise all personnel of safety rules and procedures to ensure their complete understanding and compliance.

SAFETY DEPARTMENT

The Safety Department is in charge of the overall safety for Frischhertz Electric. The Safety Department is comprised of a Safety Director, third-party safety group (Engineering Safety Consultants - ESC) and a Safety Committee.

SAFETY COMMITTEE

Frischhertz Electric Company, Inc. has a Safety Committee that is comprised of the President, Safety Director, Labor Superintendent, one Project Manager, two Frischhertz Electric Foremen, one Frischhertz Services Foreman, one Frischhertz Technologies Foreman, and a representative from ESC. Meetings of the Safety Committee are held monthly, and a review of the previous month's incidents and trends are discussed along with upcoming requirements, suggestions and concerns. This Committee is also responsible for conducting incident investigations when necessary.

EMR:

- 2021 – 0.73
- 2020 – 0.86
- 2019 – 0.88
- 2018 – 0.86

MANHOURS:

- 2020 – 357,801
- 2019 – 549,468
- 2018 – 614,842

TRIR:

- 2020 – 0.56
- 2019 – 1.82
- 2018 – 0.98

FATALITIES:

- 2020 – 0
- 2019 – 0
- 2018 – 0

LOST TIME CASES:

- 2020 – 0
- 2019 – 1
- 2018 – 0

RESTRICTED CASES:

- 2020 – 0
- 2019 – 3
- 2018 – 1

OTHER RECORDABLES:

- 2020 – 1
- 2019 – 1
- 2018 – 2

DART:

- 2020 – 0
- 2019 – 1.46
- 2018 – 0.33

SAFETY PROGRAM

EMPLOYEE TRAINING

Frischhertz Electric is a signatory contractor to the New Orleans Electrical Safety Education Plan (NOESEP), the safety training facility for Local 130. We utilize NOESEP to certify our employees for the following courses: OSHA 10, OSHA 30, First Aid/CPR/AED, NFPA 70E and Focus Four. Employees are required to have annual training.

Frischhertz Electric's post-hire training requirements include:

- 30 Hour OSHA Training for foremen, superintendents and project managers - upon hire
- 10 Hour OSHA Training for all field personnel - upon hire
- First Aid, CPR, and AED training for all personnel - second year of training and every other year (valid for 2 years)
- NFPA 70E training for all foremen and field personnel - third year of training and every other year
- Focus Four training for all foremen and field personnel - third year of training and every other year

Our third-party safety group, ESC, also trains our employees on-site for confined space, fall protection, aerial/scissor lifts, forklifts, rigging, crane awareness, scaffold safety, excavation, and more.

Frischhertz Electric has several employees who are certified instructors. These employees host training classes throughout the year including pipe bending, cable splicing, etc. We also have guest speakers attend many of our monthly safety meetings to keep our employees informed of the latest safety equipment/tools, practices, changes and concerns.

SAFETY PROGRAM

THIRD-PARTY SAFETY GROUP: ESC

ESC is a safety company that Frischhertz Electric has hired to perform the following services:

- Jobsite inspections
- On-site training
- On-site incident investigations
- OSHA inspections
- Update safety programs

DRUG TESTING

Frischhertz Electric maintains a strict drug and alcohol policy to guarantee a safe environment for our employees and quality job performance for our customers. We test for the following causes:

- New hire
- Annual
- Post Accident
- Reasonable suspicion
- Random
- Pre-job access

MEETINGS

Frischhertz Electric conducts the following meetings:

- Daily Task Safety Analysis (TSA)
- Weekly toolbox talks
- Monthly safety meetings for supervisors
- Monthly Safety Committee meetings

ADDITIONAL SAFETY STRENGTHS

Frischhertz implemented a Fit for Duty Program for field applicants. We are also an approved member of ISNetworld (ISN) and Avetta.



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ATTACHMENT C: SPECIFICATION SHEETS

RUCKUS® T750

Outdoor 4x4:4 Wi-Fi 6 Access Point with 2.5Gbps Backhaul



Benefits

Great Outdoor Wi-Fi

Experience high performance outdoor Wi-Fi 6 with IP-67 weather proofing and dual backhaul options with SFP and multi-gigabit 2.5 GbE ethernet port.

Connect More Devices Simultaneously

Improve device performance, by enabling more simultaneous device connections with built-in 8 spatial streams (dual-concurrent, 4x4:4 in 5GHz, 4x4:4 in 2.4GHz), MU-MIMO and OFDMA technology while enhancing non-Wi-Fi 6 client performance. Support for up to 1,024 clients.

High Density Performance

Provide exceptional end-user experience within high density public venues such as airports, amusement parks, stadiums, outdoor arenas, and other dense outdoor urban environments with the RUCKUS Ultra-High-Density Technology Suite.

Converged Access Point

Allow customers to eliminate siloed networks and unify Wi-Fi and IoT wireless technologies into one single network by using built-in BLE and Zigbee, and also expand to any future wireless technologies through the pluggable IoT module.

Power Other Devices

Daisy chain and power other devices like an IP camera, or another AP directly from the 1 GbE PoE output port.

Multiple Management Options

Manage the T750 from the cloud, with on-premises physical/virtual appliances, or without a controller.

Enhanced Security

Reinforce security with WPA3, the latest Wi-Fi security standard and receive enhanced protection from man-in-the-middle attacks.

Outdoor locations such as stadiums, arenas can have the most demanding wireless requirements due to high client density. The RUCKUS® T750 access point (AP), based on the latest Wi-Fi 6 standard, brings in multi-gigabit Wi-Fi to support the ever raising expectation for highest quality of service from the users. T750 is IP-67 rated to withstand the rigors of outdoor deployments.

The RUCKUS T750 is our high-end dual-band, dual-concurrent Wi-Fi 6 AP that supports eight spatial streams (4x4:4 in 5GHz, 4x4:4 in 2.4GHz). The T750, with OFDMA and MU-MIMO capabilities, efficiently manages up to 1,024 client connections with increased capacity, improved coverage and performance in ultra-high dense environments. Furthermore, the 2.5 GbE ethernet ensures that the backhaul will not be a bottleneck for full use of available Wi-Fi capacity.

The T750 addresses the increasing client demands in public venues such as airports, convention centers, plazas, malls, and other dense urban environments. It is the perfect choice for data-intensive streaming multimedia applications like 4K video transmissions, while supporting latency sensitive voice and data applications with stringent quality-of-service requirements.

The T750 is also easy to manage through physical, virtual and cloud management options.

The T750 is also designed with a small form factor pluggable (SFP) fiber interface that enable seamless connectivity to a fiber backhaul. The T750 boasts a built-in GPS. Furthermore, 1GbE PoE output port can power a variety of devices like an IP-based camera or even another AP.

In addition, organizations are increasingly leveraging IoT-based sensors to serve their customers better. These sensors run on non-Wi-Fi wireless technologies such as Wi-Fi , BLE or Zigbee. Organizations need a unified platform to eliminate network silos. The RUCKUS AP portfolio is equipped to solve these challenges.

The T750 has built-in IoT radios with onboard BLE and Zigbee capabilities. In addition, the T750 is a converged access point that allows customers to seamlessly integrate any new wireless technologies with pluggable IoT module.

The T750 when paired with the RUCKUS Ultra-High-Density Technology Suite found only in the RUCKUS Wi-Fi portfolio, dramatically improves network performance through a combination of patented wireless innovations and learning algorithms that includes:

- **Airtime Decongestion:** Increases average network throughput in heavily congested environments
- **Transient Client management:** Reduces interference traffic from unconnected Wi-Fi devices
- **BeamFlex® + Antennas:** Extended coverage and optimized throughput with patented multi-directional antennas and radio patterns

Whether you are deploying ten or ten thousand APs, the T750 is also easy to manage through RUCKUS' physical and virtual management options.

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Access Point Antenna Pattern

RUCKUS' BeamFlex+ adaptive antennas allow the T750 AP to dynamically choose among a host of antenna patterns (over 4,000 possible combinations) in real-time to establish the best possible connection with every device. This leads to:

- Better Wi-Fi coverage
- Reduced RF interference

Traditional omni-directional antennas, found in generic access points, oversaturate the environment by needlessly radiating RF signals in all directions. In contrast, the RUCKUS BeamFlex+ adaptive antenna directs the radio signals per-device on a packet by-packet basis to optimize Wi-Fi coverage and capacity in real-time to support high device density environments. BeamFlex+ operates without the need for device feedback and hence can benefit even devices using legacy standards.

Figure 1. Example of BeamFlex+ pattern

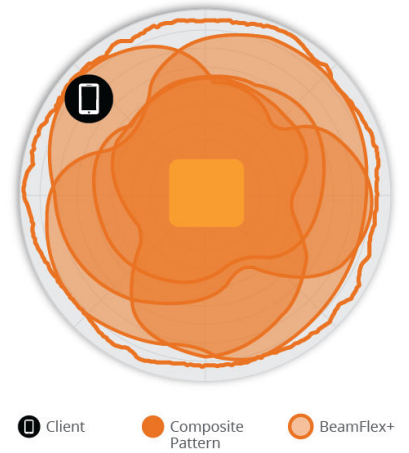


Figure 2. T750 2.4GHz Azimuth Antenna Patterns



Figure 3. T750 5GHz Azimuth Antenna Patterns



Figure 4. T750 2.4GHz Elevation Antenna Patterns



Figure 5. T750 5GHz Elevation Antenna Patterns



Note: The outer trace represents the composite RF footprint of all possible BeamFlex+ antenna patterns, while the inner trace represents one BeamFlex+ antenna pattern within the composite outer trace.

RUCKUS® T750

Outdoor 4x4:4 Wi-Fi 6 Access Point with 2.5Gbps Backhaul

Wi-Fi	
Wi-Fi Standards	<ul style="list-style-type: none">IEEE 802.11a/b/g/n/ac/ax
Supported Rates	<ul style="list-style-type: none">802.11ax: 4 to 2400 Mbps802.11ac: 6.5 to 1732 Mbps802.11n: 6.5 to 600 Mbps802.11a/g: 6 to 54 Mbps802.11b: 1 to 11 Mbps
Supported Channels	<ul style="list-style-type: none">2.4GHz: 1-135GHz: 36-64, 100-144, 149-165
MIMO	<ul style="list-style-type: none">4x4 SU-MIMO4x4 MU-MIMO
Spatial Streams	<ul style="list-style-type: none">4 for both SU-MIMO & MU-MIMO
Radio Chains and Streams	<ul style="list-style-type: none">4x4:4
Channelization	<ul style="list-style-type: none">20, 40, 80, 160MHz
Security	<ul style="list-style-type: none">WPA-PSK, WPA-TKIP, WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise, AES, 802.11i, Dynamic PSK, OWEWIPS/WIDS
Other Wi-Fi Features	<ul style="list-style-type: none">WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/vHotspotHotspot 2.0Captive PortalWISPr

RF		
	T750	T750SE
Antenna Type	<ul style="list-style-type: none">BeamFlex+ adaptive antennas with polarization diversityAdaptive antenna that provides 4,000+ unique antenna patterns per bandT750 provides internal omni-directional antenna; and T750se provides internal 120-degree sectorized antenna with option to attach an external antenna	
Antenna Gain (max)	<ul style="list-style-type: none">2.4GHz: 1.6dBi5GHz: 3.4dBi	<ul style="list-style-type: none">2.4GHz: 6.0dBi5GHz: 8.0dBi
Peak Transmit Power (Tx port/chain + Combining gain)	<ul style="list-style-type: none">2.4GHz: 28dBm5GHz: 28dBm	
Frequency Bands	<ul style="list-style-type: none">ISM (2.4-2.484GHz)U-NII-1 (5.15-5.25GHz)U-NII-2A (5.25-5.35GHz)U-NII-2C (5.47-5.725GHz)U-NII-3 (5.725-5.85GHz)	

2.4GHZ RECEIVE SENSITIVITY (dBm)							
HT20				HT40			
MCS0		MCS7		MCS0		MCS7	
-98		-79		-95		-76	
HE20				HE40			
MCS0	MCS7	MCS9	MCS11	MCS0	MCS7	MCS9	MCS11
-98	-79	-76	-70	-95	-76	-73	-67

5GHZ RECEIVE SENSITIVITY (dBm)											
VHT20				VHT40				VHT80			
MCS0	MCS7	MCS8	MCS9	MCS0	MCS7	MCS8	MCS9	MCS0	MCS7	MCS8	MCS9
-98	-80	-77	-	-95	-77	-	-72	-92	-74	-	-69
HE20				HE40				HE80			
MCS0	MCS7	MCS9	MCS11	MCS0	MCS7	MCS9	MCS11	MCS0	MCS7	MCS9	MCS11
-98	-80	-75	-70	-95	-77	-72	-67	-92	-74	-69	-64

2.4GHZ TX POWER TARGET (PER CHAIN)	
Rate	Pout (dBm)
MCS0, HT20	22
MCS7, HT20	19.5
MCS8, HE20	19
MCS9, HE40	18.5
MCS11, HE40	17

5GHZ TX POWER TARGET (PER CHAIN)	
Rate	Pout (dBm)
MCS0, VHT20	22
MCS7, VHT40, VHT80	20
MCS9, VHT40, VHT80	18.5
MCS11, HE20, HE40, HE80	17

PERFORMANCE AND CAPACITY	
Peak PHY Rates	<ul style="list-style-type: none">2.4 GHz: 1148 Mbps5 GHz: 2400 Mbps
Client Capacity	<ul style="list-style-type: none">Up to 1024 clients per AP
SSID	<ul style="list-style-type: none">Up to 31 per AP

RUCKUS RADIO MANAGEMENT	
Antenna Optimization	<ul style="list-style-type: none">BeamFlex+Polarization Diversity with Maximal Ratio Combining (PD-MRC)
Wi-Fi Channel Management	<ul style="list-style-type: none">ChannelFlyBackground Scan Based
Client Density Management	<ul style="list-style-type: none">Adaptive Band BalancingClient Load BalancingAirtime FairnessAirtime-based WLAN Prioritization
SmartCast Quality of Service	<ul style="list-style-type: none">QoS-based schedulingDirected MulticastL2/L3/L4 ACLs
Mobility	<ul style="list-style-type: none">SmartRoam
Diagnostic tools	<ul style="list-style-type: none">Spectrum AnalysisSpeedFlex

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NETWORKING	
Controller Platform Support	<ul style="list-style-type: none">SmartZoneZoneDirectorCloudStandaloneUnleashed
Mesh	<ul style="list-style-type: none">SmartMesh™ wireless meshing technology. Selfhealing Mesh
IP	<ul style="list-style-type: none">IPv4, IPv6, dual-stack
VLAN	<ul style="list-style-type: none">802.1Q (1 per BSSID or dynamic per user based on RADIUS)VLAN PoolingPort-based
802.1x	<ul style="list-style-type: none">Authenticator & Supplicant
Tunnel	<ul style="list-style-type: none">L2TP, GRE, Soft-GRE
Policy Management Tools	<ul style="list-style-type: none">Application Recognition and ControlAccess Control ListsDevice FingerprintingRate Limiting
IoT Capable	<ul style="list-style-type: none">Yes

OTHER RADIO TECHNOLOGIES	
GPS	<ul style="list-style-type: none">Types GLONAS...etc

PHYSICAL INTERFACES		
	T750	T750SE
Ethernet	<ul style="list-style-type: none">1x2.5 Gbps, 1 x 10/100/1000 Mbps ports, RJ-45LACP	
Fiber	<ul style="list-style-type: none">SFP, 1Gbps, SFP+ 10 Gbps	
USB	<ul style="list-style-type: none">1 USB 2.0 port, Type A	—
External Antenna Connectors	—	<ul style="list-style-type: none">4x N-type female connectors

PHYSICAL CHARACTERISTICS		
	T750	T750SE
Physical Size	<ul style="list-style-type: none">34.64cm (L), 24.06cm (W), 10.17cm (H)13.64in (L) x 9.47in (W) x 4.0in (H)	<ul style="list-style-type: none">34.08cm (L), 24.06cm (W), 11.17cm (H)13.42in (L) x 9.47in (W) x 4.4in (H)
Weight	<ul style="list-style-type: none">2.84kg6.27lbs	<ul style="list-style-type: none">3.31kg7.3lbs
Mounting	<ul style="list-style-type: none">Pole MountWall MountFlat SurfaceBracket included in the box	
Operating Temperature	<ul style="list-style-type: none">-40°C (-40°F) to 65°C (145°F)	
Operating Humidity	<ul style="list-style-type: none">Up to 95%, non-condensing	
Wind Survivability	<ul style="list-style-type: none">Up to 266km/h (165mph)	

POWER		
Mode	Power Consumption	System Configuration
AC Power	63.7W (SFP+ Backhaul) 64.6W (Ethernet Backhaul)	<ul style="list-style-type: none">Full Functionality2nd Ethernet Port enabledPSE Out (26W) availableOnboard IoT enabledUSB enabled (3W) - omni SKU
802.3bt Class 7 (Maximum Functionality With PSE Out)	57W	<ul style="list-style-type: none">Full Functionality2nd Ethernet Port enabledPSE Out (26W) availableOnboard IoT enabledUSB enabled (3W) - omni SKU
802.3at (Reduced Functionality Without PSE)	24.2W	<ul style="list-style-type: none">2nd Ethernet Port enabledPSE Out disabledOnboard IoT enabledUSB enabled (3W) - omni SKU
Idle	10.75W	<ul style="list-style-type: none">2nd Ethernet Port enabledPSE Out disabledOnboard IoT disabledUSB disabled

Certifications and Compliance	
Wi-Fi Alliance*	<ul style="list-style-type: none">Wi-Fi CERTIFIED™ a, b, g, n, acWi-Fi CERTIFIED™ 6Wi-Fi Enhanced Open™WPA2™ - PersonalWPA2™ - EnterpriseWPA3™ - PersonalWPA3™ - EnterpriseWi-Fi Agile Multiband™Wi-Fi Optimized Connectivity™Wi-Fi Vantage™WMM®Passpoint®
Standards Compliance**	<ul style="list-style-type: none">EN 60950-1 SafetyEN 60601-1-2 MedicalEN 61000-4-2/3/5 ImmunityEN 50121-1 Railway EMCEN 50121-4 Railway ImmunityIEC 61373 Railway Shock & VibrationEN 62311 Human Safety/RF ExposureWEEE & RoHSISTA 2A Transportation

*For complete list of WFA certifications, please see the Wi-Fi Alliance website.

**For current certification status, please see the price list.

Software and Services	
Location based services	<ul style="list-style-type: none">SPoT
Network Analytics	<ul style="list-style-type: none">SmartCell Insight (SCI)RUCKUS Analytics
Security and Policy	<ul style="list-style-type: none">Cloudpath

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ORDERING INFORMATION	
901-T750-XX01	<ul style="list-style-type: none">RUCKUS T750 Wi-Fi 6 Outdoor Wireless Access Point, 4x4:4 Stream, Omnidirectional Beamflex+ coverage, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet port, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, GPS, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature. Mounting bracket included. Does not include power adapter.
901-T750-XX02	<ul style="list-style-type: none">RUCKUS T750 Wi-Fi 6 Outdoor Wireless Access Point, 4x4:4 Stream, Omnidirectional Beamflex+ coverage, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet port, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature. No GPS functionality. Mounting bracket included. Does not include power adapter.
901-T750-XX51	<ul style="list-style-type: none">RUCKUS T750SE Wi-Fi 6 Outdoor Wireless Access Point, 4x4:4 Stream, 120-Degree Sector antenna included and option to attach external antennae, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet ports, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, GPS, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature. Mounting bracket included. Does not include power adapter.
901-T750-XX52	<ul style="list-style-type: none">RUCKUS T750SE Wi-Fi 6 Outdoor Wireless Access Point, 4x4:4 Stream, 120-Degree Sector antenna included and option to attach external antennae, 2.4GHz and 5GHz concurrent dual band, (1x) 2.5G Ethernet port, (1x) 10/100/1000 Ethernet ports, 100-240 Vac, POE in and PSE out, Fiber SFP/SFP+, IP-67 Outdoor enclosure, -40 to 65C Operating Temperature. No GPS functionality. Mounting bracket included. Does not include power adapter.

See RUCKUS price list for country-specific ordering information. PLEASE NOTE: When ordering APs, you must specify the destination region by indicating -US, -WW, -JP or -Z2 instead of XX. For access points, -Z2 applies to the following countries: Algeria, Egypt, Israel, Morocco, Tunisia, and Vietnam. Warranty: Sold with a limited 1-year warranty. For details see: <http://support.ruckuswireless.com/warranty>.

OPTIONAL ACCESSORIES	
902-0180-XX00	<ul style="list-style-type: none">PoE Injector (60W)
902-0125-0000	<ul style="list-style-type: none">Secure articulating mounting bracket
902-0134-0000	<ul style="list-style-type: none">Outdoor AP mounting bracket (weatherized aluminum), 180-degree adjustment range in both azimuth and elevation. Mounting support for solid wall or ceiling, vertical or horizontal pole 1" to 4" in diameter using enclosed mounting hardware. Pole diameter greater than 4" can be supported with user-supplied clamps.
902-1180-XX00	<ul style="list-style-type: none">Multigigabit PoE injector (2.5/5/10)-BaseT PoE port, 60W
911-2120-0000	<ul style="list-style-type: none">2.4GHz & 5GHz 14/14.5dBi 4-port directional H/V high gain antenna; with 30 degrees 3dBm beam width and 4 N-type female connectors
E1MG-LX-OM	<ul style="list-style-type: none">1000Base-LX SFP optic, SMF, LC connector, Optical Monitoring Capable
E1MG-SX-OM	<ul style="list-style-type: none">1000Base-SX SFP optic, MMF, LC connector, Optical Monitoring Capable
E1MG-SX-OM-8	<ul style="list-style-type: none">1000BASE-SX SFP optic MMF, LC connector, optical monitoring capable, 8-pack
10G-SFPP-SR	<ul style="list-style-type: none">10GBASE-SR, SFP+ optic (LC), target range 300m over MMF
10G-SFPP-LR	<ul style="list-style-type: none">10GBASE-LR, SFP+ optic (LC), for up to 10km over SMF
10G-SFPP-USR	<ul style="list-style-type: none">10GBASE-USR, SFP+ optic (LC), target range 100m over MMF
10G-SFPP-ER	<ul style="list-style-type: none">10GBASE-ER SFP+ optic (LC), for up to 40km over SMF

PLEASE NOTE: When ordering PoE injectors or power supplies, you must specify the destination region by indicating -US, -EU, -AU, -BR, -CN, -IN, -JP, -KR, -SA, -UK, or -UN instead of -XX.

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PA-113866.11-EN (01/22)

RUCKUS®
COMMScope

LinkPower™ LPS3400ATMP-300-T1

Outdoor Layer 2+ Managed Gigabit PoE Network Switch with Gigabit Fiber Uplink



APPLICATIONS

- Smart City
- Video Security Surveillances
- Campus Networks
- Wireless Service Networks
- Border Security Surveillance
- Municipal Networks
- Hospitality Networks
- Hotel Resort Networks
- Hotspot Integrations
- VOIP Services
- Traffic Monitoring

The LinkPower™ LPS3400ATMP-300-T1 Layer 2+ 6-Port Managed Outdoor PoE (Power over Ethernet) IEEE802.3bt Switch offers 4-Port Gigabit PoE with 2 SFP Uplink Port Network Switch with dual power input redundancy with 120V~240AC and/or 48V DC. This is the industry first outdoor weatherproof industrial gigabit Ethernet switch that delivers data and high power DC, i.e., up to 95W Type 4 per PoE port, over one single network cable protected with an IP68 compliant weatherproof enclosure, and the total system power is 300W. The outdoor weatherproof rating of the systems is strictly based on how the top cover is closed. For the hinged cover without the four top cover screws, the outdoor weatherproof rating is IP66 and, otherwise, the outdoor rating is IP68 with the four top cover screws securely closed with the enclosure.

The LPS3400ATMP-300-T1 Outdoor Layer 2+ Managed Gigabit PoE Switch is designed for industrial and commercial applications, e.g., high performance video surveillance, high bandwidth wireless mesh, carrier wifi installations, and etc. The terminal equipment, i.e., powered devices, such as weather-proof high power IP camera, high performance wireless AP and industrial IP telephony. With the two port Gigabit fiber ports, it can transfer data up to a distance of 120Km from SFP fiber port to a remote control center and the systems is also offer with powerful anti-electromagnetic interference feature. Additionally, the LPS3400ATMP-300-T1 Layer 2+ Managed Gigabit PoE Series is designed for harsh outdoor environments with features such as a wide working temperature range from -30°C to +70°C and 3KV Ethernet port surge protection that can ensure the reliability of the uninterrupted PoE network operations. The LPS3400ATMP-300-T1 Outdoor Gigabit PoE Switch is a Managed network switch with Link Aggregation, VLAN, Trunking, SNMP, and QoS technology to meet the accelerating demand for powering the most demanding outdoor PoE devices. The LPS3400ATMP-300-T1 Gigabit PoE Switch provide LED displays internally that show device status for easy power management and troubleshooting. The PoE technology conveniently eliminates the need to install networked devices with multiple wires, such as Inscape Data's IP cameras and SB300/BR300, and B3000/BR3000 wireless products, thereby reducing equipment and installation costs. The LPS3400ATMP-T1 Gigabit PoE Switch offers the following key features:

- Dual Power Input Redundancy with 120V~240AC and/or 48V DC
- Compliant to IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.3ab, IEEE 802.3x, IEEE 802.1D, IEEE 802.3af, IEEE 802.1Q, IEEE 802.1p, IEEE802.1x, IEEE 802.1W, SNMP, IGMP standards
- Four 10/100/1000M self-sensing RJ45 port, support IEEE802.3bt Type 3 & Type 4 PoE power supply function
- Four gigabit SFP fiber ports are capable of high bandwidth and long distance transmission
- All ports support auto-flip (Auto MDI/MDIX)
- Each PoE port can provide power 60W and up to 95W
- Supply 95W PoE++ DC power for powered devices compatible with IEEE802.3af/at
- Port security, allows setting different security level on each port with password, 802.1x, IP&MAC address Guard, RADIUS, & TACACS+
- Support IEEE802.3x full duplex flow control and duplex back pressure flow control
- Two SFP fiber optic ports, support 2.5Gbps uplink network speed
- 8K MAC address table, 12Gbps backplane bandwidth
- Its 4.5KV network port surge protection can adapt to harsh outdoor environment
- Working temperature from -30°C ~ +70°C at full load
- Compatible with Port-based VLAN, IEEE 802.1Q VLAN and GVRP protocols, & Dynamic VLAN MAC Address Authentication
- Support authentication features including TACACS+, IEEE 802.1x, HTTPS and SSH, and MAC address port locking
- Support SNMP V1/V2c/V3 for different levels network management
- Adopt RMON to effectively improve network surveillance and forecasting capabilities Auto accident report through E-mail and the output of electric relay

** LinkPower LPS Outdoor PoE Series Products are protected under several of Inscape Data's U.S. Patents.

Model Description	Outdoor 6-Port Layer 2+ Gigabit Managed PoE Switch
Model Name	LPS3400ATMP-300-T1
Port Interface	4 * 10/100/1000 RJ45 Ports, 2 * Gigabit LC Optical Ports
Optical Transmission Distance	20KM, 1310nm
Forwarding Mode	Save and forwarding, link-speed forwarding (Frame Size Range: 64~1536)
Network Media	10BASE-T: UTP Cat 3, 4, 5 (≤100 Meters) , 100BASE-TX: UTP Cat 5/5e/6 (≤100 Meters) , 1000BASE-TX: UTP Cat 5/5e/6 (≤100 Meters)
Performance Specification	Bandwidth: 12Gbps (non-blocking) Network Latency (100 to 100M bps): maximum delay less than 50 microseconds Packet forwarding rate: 8.93Mbps@64bytes MAC address table: 8K MTBF: 539608 hours Support protection for over-current, over-voltage and reverse connection
Network Protocols and PoE Standards	IEEE 802.3i 10BASET IEEE 802.3u 100BASETX IEEE 802.3x Flow Control IEEE 802.3abT Type 3 60W & Type 4 95W
LED Indicator	Running Light: SYS, Interface Light: LINK, PoE
Power Supply	AC Input voltage: 120V ~ 240V AC DC Input voltage: 48V~57V Power Connector: 3-Pin AC & 4-Pin DC industrial terminal Block System Power : 300W Surge Protection: 6kv TP Port Surge Protection: 4.5Kv
Enclosure Dimension	LxWxH: (12 x 10 x 4 inch, 304.8 x 250.4 x 101.6 mm)
Working Environment	Working Temperature: -30~70℃ Storage Temperature: -40~85℃ Relative Humidity: 5%~95%, non-condensing Storage Humidity: 10%~95%, non-condensing Working Height: 3000M above sea level (10,000ft) Storage Height: 3000M above sea level (10,000ft)
Radiation	CE mark, commercial FCC Part 15 Class B
Certification	CE Mark ,Commercial CE/LVD FCC, RoHS、C-TICK, UL
Warranty	3 Years

PACKAGE CONTENTS

- LinkPower LPS3400ATMP-300-T1 Gigabit PoE Switch
- User's Manual
- Quick Install Guide
- 3-Year Warranty Information
- APCK0001 AC Power Cable Kit
- PFCK0001-3 Power & Fiber Connector Kit
- ECK0001-4 Ethernet Connector Kit
- WMK0001 Wall Mount Kit with 4 Flanges (Standard)
- MMK0001-L Pole Mount Kit (Optional)



THE LEADING
OUTDOOR NETWORK
APPLIANCE COMPANY

Product Information Online: <http://www.inscapedata.com/lps3000-t1-mgt.htm>

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Total Turnkey Solutions for Outdoor PoE, Wired/Wireless, and IP Video Applications

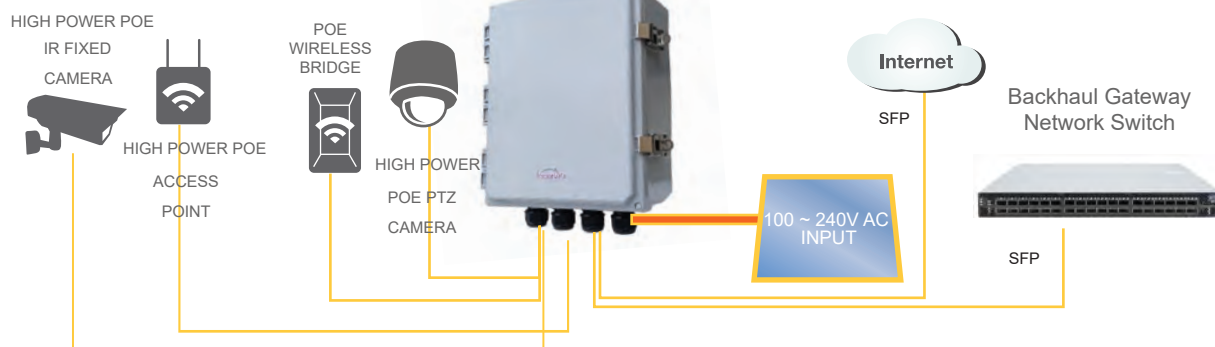
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Layer 2+ Switching	
Spanning Tree Protocol (STP)	Standard Spanning Tree 802.1d Rapid Spanning Tree (RSTP) 802.1w
G.8032 ERPS	<50ms ring protection for industrial high reliable application
Aggregation	Link Aggregation Control Protocol (LACP) IEEE 802.3ad; Up to 7 groups ; Up to 14 ports per group
VLAN	Support up to 4K VLANs simultaneously (out of 4096 VLAN IDs) ; Port-based VLAN; 802.1Q tag-based VLAN, GVRP, Dynamic VLAN MAC Address Authentication
IGMP v1/v2 snooping	IGMP limits bandwidth-intensive multicast traffic to only the requesters; supports 1024 multicast groups (source-specific multicasting is not supported)
Security	
Secure Shell (SSH) Protocol	SSH secures Telnet traffic in and out the switch, SSH v1 and v2 are supported
Secure Sockets Layer (SSL), HTTPS	SSL encrypts the http traffic, allowing advance secure access to the browser-based management GUI in the switch
Port Security	Locks MAC Addresses to ports, and limits the number of learned MAC addresses
DHCP Snooping	prevent unauthorized configuration and use of IP addresses, while providing support for IP Source Guard and ARP detection
IP Source Guard	Prevents datagram with spoofed addresses from being in the network
ARP Inspection	Prevent ARP spoofing attacks and ARP
Storm control	Prevents traffic on a LAN from being disrupted by a broadcast, multicast, or unicast storm on a port
ACLs	Support for up to 256 entries; Drop or rate limitation based on source and destination MAC, VLAN ID or IP address, protocol, port, differentiated services code point (DSCP) / IP precedence, TCP/ UDP source and destination ports, 802.1p priority, Ethernet type, Internet Control Message Protocol (ICMP) packets, IGMP packets, TCP flag
Quality of Service	
Hardware	Support 8 hardware queues
Scheduling	8 COS (Class of Service) queues per port support strict priority and weighted round-robin (WRR)
Classification	Port based; 802.1p (PCP) VLAN priority based;
Rate Limiting	Ingress policer; egress shaping and rate control; per VLAN,per port and flow based
Management (Web/ SSL, Telnet/ SSH, ping, Trivial File Transfer Protocol (TFTP), SNMP, Syslog)	
Web GUI interface	Built-in switch configuration utility for browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, maintenance, and monitoring
Dual Image	Dual image provides independent primary and secondary OS files for backup while upgrading
Firmware upgrade	Web browser upgrade (HTTP/ HTTPS) and TFTP; Upgrade through console port as well
Port mirroring	Traffic on a port can be mirrored to another port for analysis with a network analyzer or RMON probe. Up to N-1 (N is Switch's Ports) ports can be mirrored to single destination port. A single session is supported.
Other management	Single IP management; HTTP/HTTPS; SSH; RADIUS; TACACS+, DHCP Client; SNTP; cable diagnostics; ping; syslog; Telnet client (SSH secure support)

SYSTEM CONFIGURATION

Connect Up to 4 PoE Devices



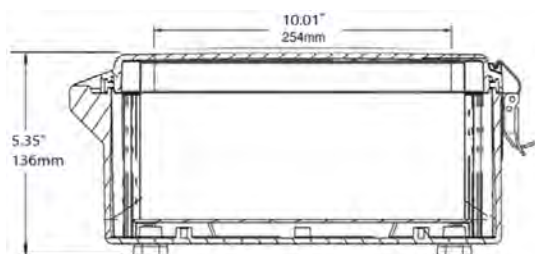
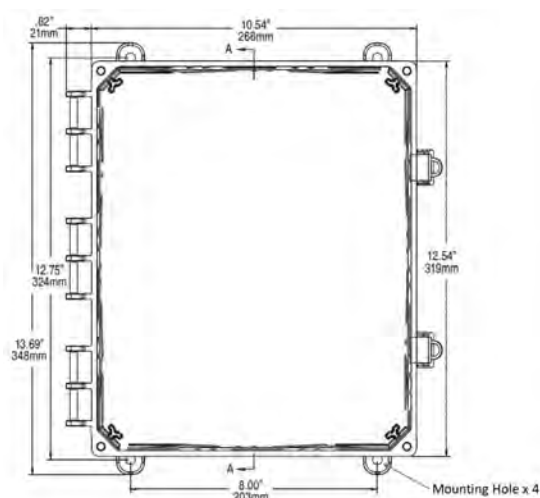
STANDARD ACCESSORIES

ECK0001-2
Ethernet Connector KitWMK0001
Wall Mounting KitAPCK0001
AC Power Cord Kit

OPTIONAL ACCESSORIES

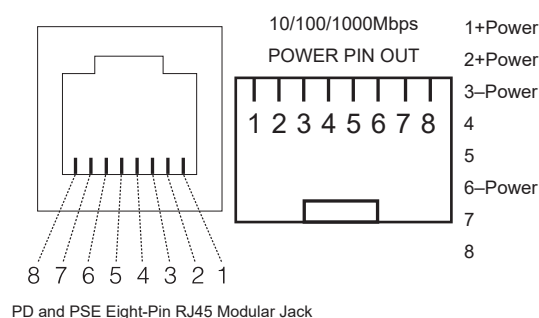
MMK0001-L Mast
Mounting Kit
(For Pole Diameter
from 2" to 4.5")WPCK0001-3-4
DC Power Cord Kit

ENCLOSURE DRAWINGS & INTERFACES

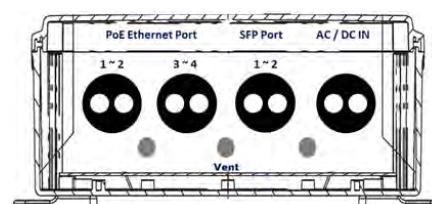
10"x5"x4" (WxLxH) Internal
(Hotel) Space for Wiring Storage

Pole Mount View

ELECTRICAL PIN OUT DIAGRAM



LPS3400ATMP-T1 Connector Interfaces



To Use Conduit Connectors, the Diameter of Hole Size is 1.0 Inch

1. Weatherproof PoE Connector (1~4)
2. Weatherproof SFP Cable Connector (1~2)
3. Weatherproof AC / DC Power Cable Connector
4. Vent Plug

60 GHz cnWave V3000

High-Gain Client Node

QUICK LOOK:

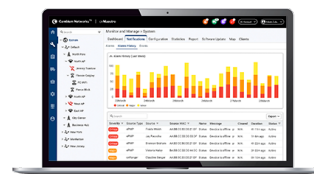
- Supports 57 to 66 GHz
- Up to 7.6 Gbps (3.8 Gbps UL and 3.8 Gbps DL) with channel bonding
- Easy installation with auto-beamforming
- Low latency < 1 ms
- 802.11ay technology with Terragraph certification



DESIGNED FOR LONG-RANGE, HIGH-CAPACITY AND HIGH-DENSITY DEPLOYMENTS

Cambium Networks' 60 GHz cnWave solution provides easy, fast and cost-effective wireless gigabit connectivity for edge access and/or high-capacity backhaul for edge access solutions at a significantly lower TCO than fiber infrastructure. Service providers and enterprises now have access to gigabit for business and residential connectivity, backhaul for Wi-Fi access or LTE/5G small cell. Certified for Facebook Terragraph, cnWave mesh solutions are highly efficient at handling high-density deployments in cities and suburban areas.

V3000 is featured with a 44.5 dBi high-gain antenna with beamforming. The client nodes can support up to 7.6 Gbps with channel bonding for both PMP and PTP configurations.



CLOUD AND ON-PREMISES MANAGEMENT

60 GHz cnWave operates with Cambium Networks' cnMaestro management system. cnMaestro™ is a cloud-based or on-premises software platform for secure, end-to-end network control. cnMaestro wireless network manager simplifies device management by offering full network visibility and zero-touch provisioning. View and perform a full suite of wireless network management functions in real time. Optimize system availability, maximize throughput and meet emerging needs of business and residential customers.

60 GHz cnWave V3000 Client Node

Specifications

Spectrum

Frequency Range	57 to 66 GHz in a single SKU
Channel Width	2.16 GHz, 4.32 GHz*
Carrier Bonding*	Up to 2 adjacent channels
Mode of Operation	PMP or Mesh, PTP

Interface

Channel Access	TDMA/TDD
Ethernet Interface	1 x 100/1000/10G BaseT with PoE In, 1 x 100/1000 BaseT with 802.3at PoE Out, 1 x SFP+

Ethernet

Protocol Supported	IPv4, IPv6
Network Management	cnMaestro, HTTP, HTTPS, SNMP v2c & v3
MTU	4,000 bytes
VLAN*	802.1ad (QinQ), 802.1Q with 802.1p priority
QoS*	4 Level QoS, DSCP and VLAN Tag

Security

Encryption	128-bit AES (optional)
Firmware Security	Signed Firmware Images

Performance

Modulation & Coding Schemes	MCS-0 (BPSK) to MCS-12 (16-QAM)
Latency	< 1 ms
Maximum EIRP	60.5 dBm

Antenna

Gain	44.5 dBi
Type	Integrated
Beamforming Scan Range	+/- 2° azimuth, +/- 1° elevation
Beam Width	0.8°

Powering

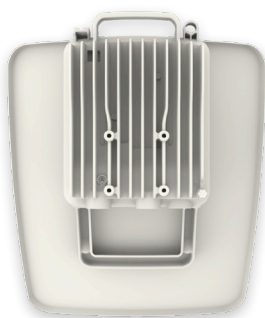
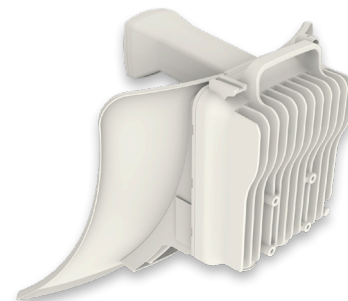
Type	Passive PoE (42-57V) without AUX PoE Out in use
Power Consumption	55 W with AUX PoE Out in use, 30 W without AUX PoE Out in use

Physical

Environmental	IP66/67
Temperature	-40°C to 60°C (-40°F to 140°F)
Mean Time Between Failure	> 40 years
Weight	< 4 kg (8.8 lbs)
Dimensions W x H x D	346 mm x 414 mm x 344 mm (13.6 in x 16.3 in x 13.5 in)
Wind Survival	200 km/h (124 mi/h)

* Available in future release

60 GHz cnWave V3000 Client Node



Ordering Information

C600500C024A	60 GHz cnWave V3000 Client Node Radio Only
C600500D001A	60 GHz cnWave V3000 Client Node Antenna Assembly
N000045L002A	Tilt Bracket Assembly
C000000L125A	cnWave Precision Mounting Bracket

NOTE: Power Supply Unit must be ordered separately.

ABOUT CAMBIUM NETWORKS

Cambium Networks empowers millions of people with wireless connectivity worldwide. Its wireless portfolio is used by commercial and government network operators as well as broadband service providers to connect people, places and things. With a single network architecture spanning fixed wireless and Wi-Fi, Cambium Networks enables operators to achieve maximum performance with minimal spectrum. End-to-end cloud management transforms networks into dynamic environments that evolve to meet changing needs with minimal physical human intervention. Cambium Networks empowers a growing ecosystem of partners who design and deliver gigabit wireless solutions that just work.



Smart**WAVE** Technologies
Enabling the Wireless Generation...



ATTACHMENT D:
PROPOSED PROJECT SCHEDULE
(SUBJECT TO CHANGE)

RFP: 0045 - LaFrenierie Park

InfoLink USA and SmartWAVE

Project Start:

Fri, 10/21/202

Display Week:

1

